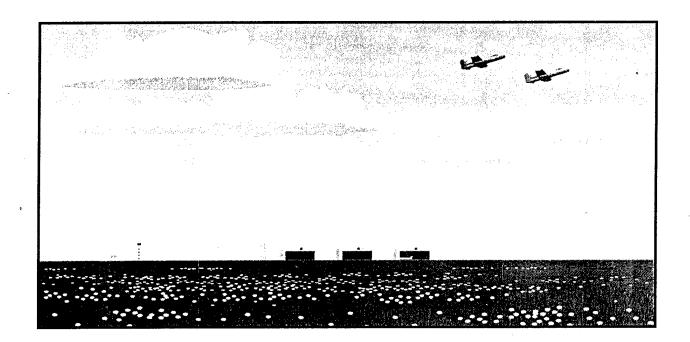
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Treatability Study for Thermatrix Flameless Thermal Oxidation



Technology Demonstration Technical Memorandum

DRAFT

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- 1. Enclosed is the draft Technology Demonstration Technical Memorandum (TDTM) for the Treatability Study for Thermatrix Flameless Thermal Oxidation. The evaluation was conducted at the Site OU C1 test pad.
- 2. According to the Interagency Agreement (IAG) this is an information document and comments are not required from the IAG signatories. Participation of the McClellan AFB Innovative Technology Program partners is encouraged. Comments to the draft TDTM should be submitted by 22 Dec 95.
- 3. If you have any questions or concerns, please contact Mr. Tim Chapman at (916) 643-2960 or Mr. Robert Shirley (916) 643-0830 ext. 151.

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TREATABILITY STUDY FOR THERMATRIX FLAMELESS THERMAL OXIDATION TECHNOLOGY DEMONSTRATION TECHNICAL MEMORANDUM

DRAFT

PREPARED FOR:

MCCLELLAN AIR FORCE BASE/EMR 5050 DUDLEY BOULEVARD, SUITE 3 McCLELLAN AFB, CALIFORNIA 95652-1389

November 22, 1995

PREPARED BY:

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USAF CONTRACT NO. F33615-90-D-4013/0004 CONTRACTOR CONTRACT NO. 269-104, DELIVERY ORDER NO. 0004

United States Air Force
Air Force Center for Environmental Excellence, Environmental Services Office
Environmental Restoration Division (AFCEE/ESR)
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6.	AUTHOR(S)			
	Radian Corporation		•	
7.	PERFORMING ORGANIZATION NAME(S) AND AD	DRESS(ES)		8. PERFORMING ORGANIZATION
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9.	SPONSORING/MONITORING AGENCY NAME(S)	AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER
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11.	SUPPLEMENTARY NOTES			
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	This document summarizes the results of a treatreatment of VOCs in soil vapor extraction (SV system in OU C1 at McClellan AFB. This work EPA Technology Innovation Office and Super	/E) offgas. The treatability study was of k was conducted in cooperation with the	conducted at the he Public Parti	ne SVE and offgas cat-ox treatment
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18. SECURITY CLASSIFICATION

OF THIS PAGE

Unclassified

19. SECURITY CLASSIFICATION

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17. SECURITY CLASSIFICATION

20. LIMITATION OF ABSTRACT

Unlimited

PREFACE

Radian Corporation is a contractor for the RI/FS Program at McClellan AFB, California. This work was performed for the Air Force Center for Environmental Excellence (AFCEE/ESR) under Air Force Contract No. F33615-90-D-4013, Delivery Order 0004.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB Air Force Base

Cal/EPA California Environmental Protection Agency

CARB California Air Resources Board

cat-oxCatalytic Oxidationcis-1,2-DCEcis-1,2-DichloroetheneCOCarbon MonoxideCO2Carbon Dioxide

CPVC Chlorinated Polyvinyl Chloride

DREs Destruction Removal Efficiencies

EPIC Environmental Process Improvement Center

ERC Emissions Reduction Credit

GAC Granulated Activated Carbon

HCl Hydrochloric Acid

Hg Mercury

IC Investigation Cluster

IWTP Industrial Wastewater Treatment Plant

lb/hr Pounds per hour

NIOSH National Institute of Occupational Safety and Health

NO_x Oxides of Nitrogen

O₂ Oxygen

O&M Operation and Maintenance

OSHA Occupational Safety and Health Administration

OU Operable Unit

ppbv Parts per billion by volume
ppmv Parts per million by volume
PRL Potential Release Locations
psi Pounds per square inch

QA/QC Quality Assurance/Quality Control
QCDA Quality Control Data Assessment

scfh standard cubic feet per hour standard cubic feet per minute

SMAQMD Sacramento Metropolitan Air Quality Management District

SVE Soil Vapor Extraction

LIST OF ACRONYMS AND ABBREVIATIONS (cont'd)

TCE

Trichloroethene

TDTM

Technology Demonstration Technical Memorandum

USAF

United States Air Force

U.S. EPA

United States Environmental Protection Agency

VOCs

Volatile Organic Compounds

۰F

Degrees Fahrenheit

TECHNOLOGY DEMONSTRATION

Page 1 of 13

EXECUTIVE SUMMARY

This technical memorandum summarizes the results of a field treatability study of the Thermatrix Flameless Thermal Oxidation treatment technology. The study was conducted at the soil vapor extraction (SVE) system located at Operable Unit (OU) C1 at McClellan Air Force Base (AFB) from 12 September to 13 October 1995. Results of this evaluation indicate that the Thermatrix technology provides a cost competitive alternative to catalytic oxidation (cat-ox) as a method of SVE offgas treatment while producing low levels of oxides of nitrogen (NO_x).

The Thermatrix treatment unit is a flameless thermal oxidation system designed to destroy volatile organic compounds (VOCs) while producing little, or no, NO_x. This evaluation was conducted in an effort to find cost-effective alternatives to cat-ox as a method of treatment for contaminated SVE offgas that achieve the same destruction removal efficiencies (DREs).

TEST OBJECTIVES

Objectives for this evaluation were to:

- Determine the DREs of the Thermatrix unit for the contaminants found in OU C1 soil vapor, primarily trichloroethene (TCE);
- Evaluate the effectiveness of Thermatrix in removing contaminants from the offgas while meeting limits set by the Sacramento Metropolitan Air Quality Management District (SMAQMD) for NO_x;
- Evaluate the cost effectiveness of the Thermatrix technology, as compared to cat-ox, in treating the contaminated SVE offgas; and
- Determine the technical difficulty of operating the system and evaluate the system reliability.

RESULTS

- The Thermatrix treatment unit achieved DREs for TCE in the range of 99.9% to 100.0%. Overall DREs for all VOCs averaged 99.9%.
- Results from two continuous emissions monitoring events indicated NO_x production was less than
 2 parts per million by volume (ppmv) during the first round and less than 1 ppm during the second.
- Capital cost for a full-scale Thermatrix unit designed to treat 500-1,000 standard cubic feet per minute (scfm) of contaminated vapor is approximately \$500,000, including a quench/acid scrubbing system. Capital cost for a comparable cat-ox unit is approximately \$350,000.
- System uptime was greater than 98% excluding shutdowns due to components external to the Thermatrix unit (i.e., acid condensation, power outages).

DRAFT

CONCLUSIONS AND RECOMMENDATIONS

- Tests results demonstrate that the Thermatrix technology achieves DREs greater than those achieved by cat-ox and provides effective treatment for the contaminants found in the OU C1 soil vapor.
- Compared to cat-ox as a treatment for contaminated SVE offgas, Thermatrix provides a cost competitive alternative. Although capital costs for a Thermatrix unit are slightly higher than cat-ox, savings are realized during operation and maintenance. Because of the relative simplicity of the Thermatrix unit design, less maintenance on the unit is expected compared to that for a cat-ox system. The ceramic matrix used in the Thermatrix unit is designed to last the life of the unit unlike the catalyst in a cat-ox system.
- Production level of NO_x by the Thermatrix technology is lower than cat-ox typically less than 2 ppm.
 Typical NO_x emissions from a cat-ox unit are over 5 ppmv. The reduced NO_x production of the
 Thermatrix technology provides a advantage over cat-ox to aid in the achievement of McClellan AFB's
 basewide air emission goals. In addition this results in increased cost savings as fewer NO_x offsets
 would need to be purchased by the Base.

1.0 PROJECT DESCRIPTION

- This treatability study was conducted to determine the feasibility of the Thermatrix Flameless Thermal Oxidation treatment technology as an alternative to cat-ox for treatment of contaminated SVE offgas. The study was conducted at the SVE system treatability study pad located at OU C1 at McClellan AFB from 12 September to 13 October 1995.
- This demonstration was accomplished as part of the Environmental Process Improvement Center (EPIC) partnership between the California Environmental Protection Agency (Cal/EPA), the United States Environmental Protection Agency (U.S. EPA), and McClellan AFB. The evaluation was conducted in cooperation with the Public-Private Partnership formed to evaluate innovative technologies for environmental remediation of hazardous waste sites such as those at McClellan AFB. Members of this partnership include the United States Air Force (USAF), Clean Sites, U.S. EPA Technology Innovation Office and Superfund Innovative Technology Evaluation Program, Cal/EPA, Radian Corporation (Radian), Dow Chemical Company, Beazer East, Inc., Southern California Edison, Xerox Corporation, American Telephone and Telegraph Company, Monsanto Chemical Company, and DuPont Chemicals.
- All treatability study activities were conducted in accordance with the Treatability Study for Thermatrix
 Flameless Thermal Oxidation Work Implementation Plan and Site Health and Safety Plan (Radian,
 1995), approved by the Air Force and regulatory agencies.

Site Background

• OU C1 covers approximately 23 acres in the southwest portion of McClellan AFB as shown in Figure 1-1. The OU is comprised of three confirmed sites (Sites 22, 42, and 69) and two Potential Release Locations (PRLs 41 and 68). The area was used from the mid-1940s to 1970 for open bulk storage and burning of liquid and solid wastes. Specific uses included waste oil and solvent storage, burn pits, a refuse incinerator, and construction debris storage and burial (URS, 1994).

Elkhorn Blvd McClellan, **AFB** Downtown Sacramento 705 OU C1 O O SVE and Catox О System Treatability Study Pad 714

Figure 1-1. Site Location

• Site 42 originally consisted of pits that reportedly held waste solvents and oil burning sludge. The northern portion of the site may also have been used as a fire training area. The Industrial Waste Treatment Plant was later constructed over this site, including an aeration basin that was removed from service in 1987, but remains in place. PRL 68 lies immediately west of Site 42 and covers four small areas corresponding to former locations of pits thought to have been used for the storage of waste oil (URS, 1994).

Building and Building Number

Several investigations have been conducted at OU C1 since 1986 to determine the nature and extent of
contamination. Volatile organic compounds have been detected in the soil and groundwater at the OU.
The main contaminant of concern at the site is trichloroethene (TCE). Other contaminants of concern
include cis-1,2-dichloroethene (cis-1,2-DCE), benzene, and vinyl chloride.

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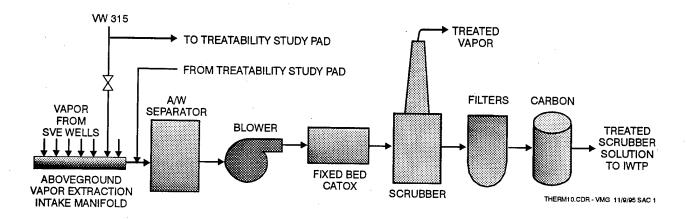
LOCATION MAP

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OU C1 SVE and Treatment System

• An SVE system, consisting of seven extraction wells, is located in OU C1 to extract contaminated soil vapor from Site 42 and PRL 68. Offgas from the wells is treated by cat-ox followed by an acid scrubber. A schematic of the system is shown in Figure 1-2. The SVE and cat-ox systems are designed to extract and treat 1,000 scfm of contaminated vapor. Vapor was extracted from an existing vapor well, VW-315, and routed through the Thermatrix unit to conduct this study.

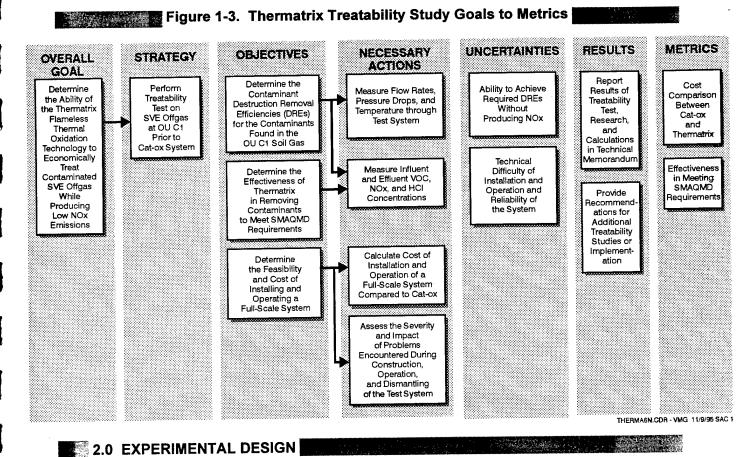
Figure 1-2. Existing SVE and Treatment System Schematic



- Soil vapor from the seven wells is collected at a main manifold before entering the cat-ox unit as a single stream. For the purposes of this evaluation, the valve at VW-315 was closed at the main manifold and piping was installed to route the vapor to the Thermatrix unit.
- Extraction well VW-315 is screened from 60 to 90 feet below ground surface in the deep zone of the
 contaminant plume. The TCE concentrations in soil gas samples collected from this well during
 installation ranged from non-detect to 1,700 ppmv.

Test Objectives

The goals, strategies, and metrics established for this evaluation are presented in Figure 1-3.



2.0 EXPERIMENTAL DESIGN

Thermatrix Test System Description and Schematic

A schematic diagram of the polymer test system is shown on Figure 2-1.

- The test system used during this evaluation consisted of a contaminated vapor stream drawn through the air/water knockout pot, into a small blower, and discharged through the Thermatrix unit. Within the Thermatrix unit, the contaminants are oxidized at a preset temperature of 1600°F in an inert, ceramic bed matrix. During the oxidation process, the VOCs react to form carbon dioxide (CO₂), water, and hydrochloric acid (HCl). To sustain the oxidation temperature, heat released by the reaction is absorbed by the large thermal mass of the ceramic matrix. An electric preheater is used during system startup and shuts off automatically once the unit reaches the set oxidation temperature.
- For treatment of chlorinated compounds, the addition of natural gas to the process flow is necessary to maintain the hydrogen-to-halogen ratio required for complete oxidation of the contaminants.
- In-line temperature sensors and microprocessor controls allow the system to maintain stable operation even for streams with widely fluctuating flow rates or organic concentrations.
- Data from tests performed by Thermatrix indicate that the technology is effective in treating VOCs over a wide range of concentrations. Test data show DREs of 99.99% or greater for VOC concentrations ranging from 400 ppmv to 31,000 ppmv. No reduction in effectiveness or adverse operating effects were reported for either high or low concentrations.

TREATABILITY STUDY PAD SAMPLE BLOWER PORT NATURA GAS 240 V AC THERMATRIX ES 300 UNIT **ELECTRIC PREHEATER** VW 315 **CERAMIX MATRIX** TO IWTP KNOCKOUT POT SAMPLE PORT CLOSED TREATED VAPOR **VENTED TO** ATMOSPHERE **VAPOR** FROM SVE WELLS **EXISTING CATALYTIC** To Atmosphere OXIDATION TREATMENT **ABOVEGROUND VAPOR EXTRACTION INTAKE MANIFOLD** LEGEND: Vapor Flow Water Flow ∨alve ∇ Sample Port **IWTP** Industrial Wastewater Treatment Plant

Figure 2-1. Test System Schematic

- During destruction of chlorinated VOCs, such as TCE, the chlorine is converted to HCl. For the purposes of this treatability study it was determined, with concurrence from the SMAQMD, that HCl production would be minimal and not require the addition of an acid-scrubbing system to the unit. In a full-scale Thermatrix system, with higher flows, the HCl production rate would be great enough to require an acid-scrubbing system to remove the HCl before discharging the treated vapor to the atmosphere.
- The Thermatrix system used for this test consists of a skid-mounted ES 300 unit designed for a flow rate of 300 standard cubic feet per hour (scfh), or 5 scfm. The unit was placed on the concrete treatability study pad and connected to VW-315, prior to the cat-ox treatment system at OU C1. A blower was used to draw vapor from the well and feed it through the Thermatrix treatment system. Natural gas was plumbed to the unit and fed into the inlet stream at approximately 4 scfh.
- The test system was equipped with sampling ports for collecting inlet and outlet vapor samples. Flow
 meters, pressure gauges, and temperature gauges were provided for measuring the system operating
 parameters. Tables 2-1 and 2-2 summarize the frequency of sampling, sampling rationale, analytical
 methods, and quality assurance/quality control (QA/QC) procedures followed during the test.

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Table 2-1. Sam	pling and Anal	vsis for Chemic	al Parameters
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CITATION .

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Sample Location	Analyte(s) (Analytical Method)	Sample Rationale/ Data Use	Sample Frequency	QA/QC Samples	
Thermatrix Unit Inlet	VOCs (TO-14, modified Method 18)	Measure inlet VOC concentrations	• Week 1: Daily (5 sampling events)	10% field duplicates	
		• Calculate contaminant DREs	• Weeks 2-4: 3 days per week (9 sampling events)		
Thermatrix Unit Outlet	VOCs (TO-14, modified Method 18); NO _x , CO ₂ , CO, O ₂	• Measure outlet VOC, NO _x , CO ₂ , CO, O ₂ , and HCl concentrations	• Week 1: Daily for VOCs; once for NO _x , CO ₂ , CO, O ₂ , and HCl	10% field duplicates	
	(CARB 100); HCl (CARB 421)	• Calculate contaminant DREs	Weeks 2-4: 3 days per week for VOCs; once		
		• Determine air emissions	during week 4 for NO _x , CO ₂ , CO, O ₂ , and HCl		
Various locations at Treatability Study Pad	HCl (Draeger colorimetric tubes)	Health and safety sam- pling to ensure person- nel were not exposed to hazardous levels of HCl	During each site visit	Multiple samples taken during each event	

Table 2-2. Sampling for System Parameters

Sample Location	System Parameters	Sample Rationale/ Data Use	Sample Method	Sample Frequency
Thermatrix Unit Inlet and	Pressure	Determine pressure drop through test system	Pressure gauges	Same as analytical sampling
Outlet	Temperature	• Determine temperature increase across test unit.	Temperature gauges	Same as analytical sampling
Thermatrix Unit Inlet	Flow Rate	Calculate contaminant removal rate	Annubar flow measurement device	Same as analytical sampling

- Microprocessor-based controls shut down the electric preheater after the matrix has reached a preset
 oxidation temperature. The system operation is constantly monitored by these controls and adjustments
 are automatically made to ensure that the ceramic matrix remains at the proper temperature to obtain
 complete oxidation of the contaminants.
- The test system was equipped with control relays that shut off the blower and Thermatrix unit if the power failed. A check valve in the Thermatrix test system prevented any contaminated vapor from escaping through the system during system shutdowns.
- The system was monitored and samples collected for five consecutive days during the first continuous week of testing. During the remainder of the test, weeks two through four, samples were collected for VOC analysis using U.S. EPA Method TO-14 and modified Method 18, and the system operating parameters recorded three times per week. Sampling for NOx, CO₂, carbon monoxide (CO), and oxygen (O₂), using California Air Resources Board (CARB) Method 100, and HCl, using CARB Method 421, were conducted twice each during the test.

3.0 TREATABILITY STUDY AND RESULTS

Test Results

- The analytical results from the test and the DREs achieved for VOCs are summarized in Table 3-1. Results from the two rounds of NO_x and HCl monitoring are summarized in Table 3-2. Laboratory analytical results of all samples taken, including the HCl and NO_x monitoring, are presented in Appendix A.
- Inlet concentrations of total VOCs during the test ranged from 370,000 parts per billion by volume (ppbv) to 710,000 ppbv.
- The Thermatrix treatment unit achieved DREs for TCE in the range of 99.9% to 100.0%. Overall DREs for all VOCs averaged 99.9%. Actual DREs may be higher. Because many of the compounds were not detected in the outlet vapor samples, the laboratory detection limit was used to calculate the DREs. However, the inlet concentrations are relatively low compared to the detection limits of the outlet samples, which may result in calculated DREs lower than the actual DREs. DREs reported for cat-ox systems currently operating at McClellan AFB range from 94-98% (URS, 1995).

Table 3-1. Summary of Test Results

Compound	Avg. Inlet Conc. (ppbv)	Avg. Outlet Conc. (ppbv)	Avg. DRE (%)
cis-1,2-DCE	18,200	2.3	99.9
Chloroform	1,871	1.5	99.9
Benzene	2,707	2.0	99.9
TCE	567,333	31.1	99.9
Toluene	1,467	2.6	99.8
m,p-Xylene	6,373	2.2	99.9
o-Xylene	5,173	2.0	99.9
Acetone	6,538	16.5	99.7
Vinyl Chloride	2,607	128.7	94.7
nnby = narts ner hi	llion by volume	············	

Table 3-2. Summary of NO_x and HCI Sampling

_	Thermatrix Outlet Concentrations			
Compound ^a	Round 1	Round 2	Average	
NO_x	1.7 ppmv	0.8 ppmv	1.3 ppmv	
CO_2	9.7%	9.4%	9.6%	
CO	< 1.0 ppmv	< 0.5 ppmv	< 0.8 ppmv	
O_2	7.1%	9.8%	8.5%	
HCl	0.092 lb/hr	0.045 lb/hr	0.069 lb/hr	

a Sampling for NO_x, CO₂, CO, and O₂ was performed by Best Environmental, Inc. on 9/20/95 and 10/11/95. Sampling for HCl was conducted by Radian Corp. on 9/22/95 and 10/6/95.

ppmv = Parts per million by volume. lb/hr = Pounds per hour.

- Results from two continuous emissions monitoring events indicated NO_x production was less than 2 ppm during the first round and less than 1 ppm during the second.
- Results from the two HCl sampling results showed an average HCl production rate of 0.069 pounds per hour (lb/hr). This was well below the 0.6 lb/hr originally calculated and approved by the SMAQMD.
- The test system operating parameters monitored during the test are summarized in Table 3-3. Field data sheets containing system measurements recorded during the test are included in Appendix B.

Actual power usage by the blower and Thermatrix preheater were not recorded during the test. The
blower was on for approximately 600 hours during the 31-day test. Power usage by the preheater was
limited to a couple of hours each time the unit was started up.

Table 3-3. Test	System Operating Parame	eters
Parameter	Operating Range	Avg. Value During Test
VW-315 Vacuum	1.5 – 3.5" Hg	2.4" Hg
Blower Inlet Vacuum	12 – 16" Hg	15" Hg
Blower Outlet Pressure	0.25 – 2 psi	1.2 psi
Blower Outlet Temperature	140 – 185° F	165° F
Natural Gas Flow Rate	3-6 scfh	4.2 scfh
Flow Rate through Thermatrix	4.7 - 5.1 scfm	5.0 scfm
Thermatrix Oxidation Temperature	1590 – 1602° F	1600° F
Thermatrix Outlet Temperature	80 – 240° F	145° F

Operational Difficulties and Resolutions

No problems were encountered with the operation of the Thermatrix unit during the treatability test. Maintenance problems encountered were due to components external to the Thermatrix unit. These include test system modifications required to handle the unanticipated condensation of HCl in the treated exhaust gas and downtime due to external electrical problems.

- Shortly after the initial system startup, it was discovered that HCl was condensing out of the exhaust gas. The acid condensate reacted with the steel exhaust piping, creating a crystalline deposit that clogged the exhaust stack, causing a nuisance odor at the Treatability Study Pad. Design phase predictions of outlet temperatures from the unit by Thermatrix were approximately 300°F, high enough to ensure that the HCl remained in a vapor state. Because of the anticipated high temperature, steel exhaust piping was chosen during the design. However, the actual exhaust temperature observed during the test was approximately 110°F. Although the unit was expected to produce HCl during the oxidation of the VOCs, it was not anticipated that the HCl would condense out of the vapor. The problem was alleviated during the remainder of the test by replacing the steel piping with chlorinated polyvinyl chloride (CPVC) piping and adding a sealed bucket to act as a HCl knock out pot. Readings were taken using Draeger colorimetric tubes for HCl during each sampling and monitoring event to ensure that the HCl levels at the pad were below the National Institute of of Occupational Safety and Health/Occupational Safety and Health Administration (NIOSH/OSHA) ceiling value of 5 ppm.
- The test system was automatically shut off several times during the initial part of the test when the OU C1 cat-ox system shut down. The control relays were initially wired to shut off the Thermatrix unit if the cat-ox system was shut off as an added precaution. It was later determined that this was not necessary and the test system was rewired to remain on when the cat-ox system shut off.

 A day and a half of downtime was experienced during the third week of the test due to power failures at the Base caused by high winds. The system was restarted several times but shut down by additional power failures. It was decided to leave the unit off until dependable power was restored.

Quality Assurance/Quality Control

A quality control data assessment (QCDA), included as Appendix C, was performed on data to ensure
that they are valid and can be used for their intended purpose. Results of the QCDA indicate that the
data are valid and can be used to evaluate the performance of the Thermatrix technology. All data were
collected in accordance with the McClellan AFB Basewide RI/FS Quality Assurance Project Plan
(Radian, 1994).

4.0 COST ANALYSIS

Table 4-1 presents a cost comparison of capital and operating and maintenance (O&M) costs for cat-ox and Thermatrix as a treatment for contaminated soil vapor. Since the relative operating costs of both the Thermatrix and cat-ox systems are not highly sensitive to contaminant stream concentrations, the cost analysis was performed on a daily basis rather than cost per pound of contaminant removed. Calculations and data used to perform the cost comparison are included in Appendix D.

Description	Unit Cost	Cat-ox (\$/day)	Thermatrix (\$/day
Capital Cost ^a	Lump Sum	218.83	309.67
O&M			
Electricity	\$0.061/kWh	30.87	20.53
Natural Gas	\$0.233/therm	29.73	25.63
Labor	\$60/hr	264.00	90.00
Catalyst Replacement		9.00	N/A
NO _x ERCs		12.21	2.22
Total		564.64	448.05

a Capital cost is a lump sum amortized over a 5-year period at 5% annual interest. N/A = Not applicable.

Assumptions for Cost Comparison

- Continuous operation with 90% actual uptime (22 hours/day).
- 5-year project lifetime, annual adjusted interest rate of 5%.
- Inlet vapor stream concentrations similar to those at OU C1, as presented in Table 3-1.

- NO_x emissions rate for the Thermatrix unit is based on emissions monitoring performed during the treatability test.
- O&M costs for a cat-ox system are based on average monthly operating costs reported for the cat-ox systems located at Investigation Cluster (IC) 1, IC7, and OU C1 at McClellan AFB (URS, 1995).
- NO_x emissions rate for cat-ox is based on data reported for the OU C1 cat-ox system (URS, 1995).
- Capital and catalyst costs for a cat-ox system were based on a recent cost analysis by MITRE Corporation (MITRE, 1995).
- Cost of Emissions Reduction Credits (ERCs) for NO_x were based on ERC transactions conducted in 1994 (Radian, 1995).
- Costs are for comparison purposes and do not include all cost associated with design, installation, startup, O&M, or monitoring. Costs not included in the comparison, such as construction, analytical, and caustic costs, are assumed to be similar for both types of treatment systems.

5.0 LESSONS LEARNED

Performance

- DREs for VOCs, including vinyl chloride, achieved by the unit during the test were typically greater than 99.9% and as high as 100.0%.
- Production levels of NO_x were below the 2 ppmv maximum claimed by the vendor.
- The condensation of HCl in the exhaust gas presented a logistical problem during this treatability study, however it did not affect performance of the unit in treating the contaminants.

Implementation ()

- The Thermatrix system is easy to install and operate and requires little maintenance or monitoring during normal operation.
- Thermatrix units are custom designed and manufactured for each application. Unit size and cost are dictated by the required range of flow rates and not contaminant concentration.
- Installation and implementation considerations, including size, utility, and equipment requirements, for a full-scale Thermatrix system would be similar to those for a cat-ox system.
- Capital cost for a full-scale Thermatrix unit designed to treat 500-1,000 scfm of contaminated vapor is approximately \$500,000, including an acid scrubbing system.

- Capital cost for a full-scale Thermatrix unit designed to treat 500-1,000 scfm of contaminated vapor is approximately \$500,000, including an acid scrubbing system.
- Production of HCl during this test was at a low enough level to not require removal from the exhaust
 gas prior to discharge to the atmosphere, however unanticipated condensation of the HCl, due to low
 exit temperatures, led to modifications being required in the exhaust piping. Larger scale Thermatrix
 systems are designed so that the exhaust gas exiting the system is at a temperature high enough to keep
 the HCl in a gaseous state. A full-scale system would require a quench system followed by an acid
 scrubber to remove the HCl prior to discharge.
- If a Thermatrix system were to be used to replace an existing cat-ox system, cost savings could be realized by using the existing acid scrubbing system.
- Design, fabrication, and delivery of the unit would take approximately 22 weeks after receipt of a purchase order.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- Tests results demonstrate that the Thermatrix technology achieves greater DREs and lower NO_x production than those achieved by cat-ox, and provides effective treatment for the contaminants found in the OU C1 soil vapor.
- The Thermatrix technology would not normally be cost effective for treatment of low-concentration contaminant streams because the size of the unit and operating cost are dependent on flow rate and not contaminant concentrations. This means that in comparing treatment of a low-concentration to a high-concentration contaminant stream, that the same size unit and actual power requirements would be necessary for destruction of less contaminant mass. An adsorptive technology, such as granulated activated carbon (GAC) would be more cost effective for treatment of low-concentration streams. A generally accepted cut-off for cost-effective treatment by GAC, as opposed to cat-ox, is VOC concentrations below 100 ppmv. Operating costs for Thermatrix are similar to cat-ox, therefore the cut-off is assumed to be the same.
- Compared to cat-ox as a treatment for contaminated SVE offgas, Thermatrix provides a cost competitive alternative. Although capital costs for a Thermatrix unit are slightly higher than cat-ox, savings are realized during operation and maintenance. Because of the relative simplicity of the Thermatrix unit design, less maintenance on the unit is expected compared to that for a cat-ox system. The ceramic matrix used in the Thermatrix unit is designed to last the life of the unit unlike the catalyst in a cat-ox system.
- Production level of NO_x by the Thermatrix technology is lower than cat-ox typically less than 2 ppm.
 Typical NO_x emissions from a cat-ox unit are over 5 ppmv. The reduced NO_x production of the
 Thermatrix technology provides a advantage over cat-ox to aid in the achievement of McClellan AFB's
 basewide air emission goals. In addition this results in increased cost savings as fewer NO_x offsets
 would need to be purchased by the Base.

7.0 REFERENCES

- MITRE Corporation, 1995. Soil Vapor Extraction Curtailment Process Development. Prepared for McClellan AFB/EM, McClellan AFB, California. June.
- Radian Corporation, 1994. Installation Restoration Program Basewide RI/FS Quality Assurance Project Plan. Final. Prepared for United States Air Force, Air Force Center for Environmental Excellence, Environmental Services Office, Environmental Restoration Division (AFCEE/ESR), Brooks AFB/EM, Texas. November.
- Radian Corporation, 1995. Treatability Study for Thermatrix Flameless Thermal Oxidation Work Implementation Plan and Site Health and Safety Plan. Final. Prepared for McClellan AFB/EM, McClellan AFB, California. September.
- Radian Corporation, 1995. Casting Emission Reduction Program (CERP) Authority to Construct Permit Application Support Document, Volume I of II. Final. Prepared for McClellan AFB, California. September.
- Thermatrix Inc., 1992. Destrucion of Organic Compounds in the Thermatrix Flameless Thermal Oxidizer. May.
- URS Consultants, 1994. Final Site-Specific Removal Action Work Plan for Soil Vapor Extraction System at Site OU C1. Prepared for McClellan AFB/EM, McClellan AFB, California. December.
- URS Consultants, 1995. McClellan AFB SVE Sites IC 1, IC 7, and OU C1 Monthly Operations Report. Prepared for McClellan AFB/EM, McClellan AFB, California. June, July, August.

APPENDIX A

Analytical Data Sheets



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509096A

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8036

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/13/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED: 9/22/95

AMOUNT\$: \$410.00

RECEIPT

FRACTION #	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-001	TO-14	9.5 "Hg	\$205.00
02A	TEN-002	TO-14	9.0 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

Laboratory Director

SAMPLE NAME: TIN-001 ID#: 9509096A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091307 Date of Collection: 9/12/95
Dil. Factor: 5600 Date of Analysis: 9/13/95
Analyst's Initials: BJM

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	2800	Not Detected
1,1-Dichloroethene	2800	Not Detected
Freon 113	2800	Not Detected
cis-1,2-Dichloroethene	2800	19000
Chloroform	2800	Not Detected
1,1,1-Trichloroethane	2800	Not Detected
Benzene	2800	3700
Trichloroethene	2800	660000
Toluene	2800	Not Detected
Tetrachloroethene	2800	Not Detected
m,p-Xylene	2800	3800
o-Xylene	2800	3600
Acetone	11000	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates		% Recovery Method Limits
Octafluorotoluene		95 70-130
Toluene-d8	Mark Referen	100 70-130
4-Bromofluorobenzene		99 70-130

SAMPLE NAME: TEN-002 ID#: 9509096A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091310 Date of Collection: 9/12/95
Dil. Factor: 1.9 Date of Analysis: 9/13/95
Analyst's Initials: BJM

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.95	Not Detected
1,1-Dichloroethene	0.95	Not Detected
Freon 113	0.95	Not Detected
cis-1.2-Dichloroethene	0.95	0.98
Chloroform	0.95	Not Detected
1,1,1-Trichloroethane	0.95	Not Detected
Benzene	0.95	1.0
Trichloroethene	0.95	32
Toluene	0.95	Not Detected
Tetrachloroethene	0.95	Not Detected
m,p-Xylene	0.95	Not Detected
o-Xylene	0.95	Not Detected
Acetone	3.8	10

Container Type: 6 Liter Summa Canister

Surrogates		% Recovery	Method Limits
Octafluorotoluene		94	70-130
Toluene-d8		103	70-130
4-Bromofluorobenz	ene	104	70-130

SAMPLE NAME: Method Spike ID#: 9509096A-03A

EPA METHOD TO-14 GC/MS Full Scan

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File Name: 9091302	Date of Collection: NA
Dil. Factor: 1.0	
	Date of Analysis: 9/13/95
Analyst's Initials: DP	

Compound	Det. Limit (ppbv)	% Recovery	
Vinyl Chloride	0.50	138 Q	
1,1-Dichloroethene	0.50	108	
Freon 113	0,50	108	
cis-1,2-Dichloroethene	0.50	106	
Chloroform	0.50	102	
1,1,1-Trichloroethane	0.50	102	
Benzene	0.50	112	
Trichloroethene	0.50	97	
Toluene	0.50	102	
Tetrachloroethene	0.50	91	
m,p-Xylene	0.50	93	
o-Xylene	0.50	98	
Acetone	2.0	101	

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Q = Exceeds Quality Control limits.

Container Type: NA

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	96 70-130
Toluene-d8	100 70-130
4-Bromofluorobenzene	104 70-130

SAMPLE NAME: Lab Blank ID#: 9509096A-04A

EPA METHOD TO-14 GC/MS Full Scan

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Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

Surrogates	% Recovery Method Limits
Octafluorotoluene	93 70-130
Toluene-d8	99 70-130
4-Bromofluorobenzene	97 70-130

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CORPORATION
10395 OLD PLACERVILE ROAD, SACRAMENTO, CA 95627
(916) 362-5332

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509096B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8036

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/13/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/22/95

AMOUNT\$: \$100.00

		RECEIPT			
FRACTION#	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE	
01A	TIN-001	Mod. Method 18	9.5 "Hg	\$50.00	
02A	TEN-002	Mod. Method 18	9.0 "Hg	\$50.00	
03A	Method Spike	Mod. Method 18	NA	NC	
04 Δ	I ab Blank	Mod. Method 18	NA	NC	

plat Sala

CERTIFIED BY: Sanda J. //

Laboratory Director

DATE: 9/92/75

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

108	50	1.0	Vinyl Chloride	NA	A0913001	ASD-ROBORDS	Method obike
% Recovery							Spiked Sample
Not Detected	50	1.0	Vinyl Chloride	NA	A0913002	9509096B-04A ~	Lab Blank
Not Detected	95	1.9	Vinyl Chloride	9/12/95	A0913004	9509096B-02A	TEN-002
3300	100	2.0	Vinyl Chloride	9/12/95	A0913003	9509096B-01A	1 - N-00 -
(ppbv)	(ppbv)	Factor	For	Date	Name	Sample I.D.	Sample I.D.
Amount	Det. Limit	Dilution	Analyzed	Sample	File	Lab	Field

Analysis Date: 9/13/95

Container Type: 6 Liter Summa Canister

Analyst's Initials: JS

Comments: NA = Not Applicable

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509133A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

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Austin, TX 78720-1088

PHONE:

916-362-5332

FAX:

DATE RECEIVED: 9/15/95 **DATE COMPLETED 9/22/95**

916-362-2318

INVOICE # 8037

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNTS: \$410.00

			RECEIPT	•
FRACTION#	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-003	TO-14	8.5 "Hg	\$205.00
02A	TEN-004	TO-14	8.0 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04 A	Lab Blank	TO-14	NA	NC

CERTIFIED BY Simulas

Laboratory Director

SAMPLE NAME: TIN-003 ID#: 9509133A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091606 Dil. Factor: 3700	Date of Collection: 9/14/95 Date of Analysis: 9/16/95
Analyst's Initials: BJM	January State Control of the Control

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1900	Not Detected
1,1-Dichloroethene	1900	Not Detected
Freon 113	1900	Not Detected
cis-1,2-Dichloroethene	1900	21000
Chloroform	1900	2100
1,1,1-Trichloroethane	1900	Not Detected
Benzene	1900	
Trichloroethene	1900	4200
Toluene	1900	690000
Tetrachloroethene	1900	Not Detected
m,p-Xylene	1900	Not Detected
o-Xylene		6300
Acetone	1900	5200
	7400	Not Detected

<u>Surrogates</u>	% Recovery Method Limits
Octafiuorotoluene	94 70-130
Toluene-d8	98 70-130
4-Bromofluorobenzene	101 70-130

SAMPLE NAME: TEN-004 ID#: 9509133A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091607 Date of Collection: 9/14/95
Dil. Factor: 1.8 Date of Analysis: 9/16/95
Analyst's Initials: BJM

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.90	Not Detected
1,1-Dichloroethene	0.90	Not Detected
Freon 113	0.90	Not Detected
cis-1,2-Dichloroethene	0.90	1.3
Chloroform	0.90	Not Detected
1,1,1-Trichloroethane	0.90	Not Detected
Benzene	0.90	2.1
Trichloroethene	0.90	51
Toluene	0.90	3.2
Tetrachloroethene	0.90	Not Detected
m,p-Xylene	0.90	2.1
o-Xylene	0.90	1.4
Acetone	3.6	16

<u>Surrogates</u>		Recovery Method Limits
Octafluorotoluene		99 70-130
Toluene-d8		104 70-130
4-Bromofluorobenz	ene	106 70-130

SAMPLE NAME: Method Spike ID#: 9509133A-03A

EPA METHOD TO-14 GC/MS Full Scan

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The state of the s	SOURCE AND A SOURCE AND ASSESSMENT OF THE PARTY OF THE PA
File Name: 9091602 Date of Collection	
THE NUMBER OF THE PROPERTY OF	♠ 156 ♠ 176 × 46 600 € 50 € 50 € 50 € 50 € 50 € 50 € 50
- Company of the Co	
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Dil. Factor: 1.0 Date of Analysis:	
UII. PACTOF	AHAMP
Dil. Factor: 1.0 Date of Analysis:	MINMS SERVING MINERAL
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	Star 19 20 Start (1997) 1980 Charles (1997) 11 - 1
Analyst's Initials: BJM	
Analyst's Initials:	\$2000000000000000000000000000000000000
	A serritorio Violetti (Saletti Saletti Saletti (Saletti Saletti Saletti Saletti Saletti Saletti Saletti (Salett

Compound	pound Det. Limit (ppbv)	
Vinyl Chloride	0.50	% Recovery
1,1-Dichloroethene	0.50	94
Freon 113	0.50	90
cis-1,2-Dichloroethene	0.50	98
Chloroform	0.50	98
1,1,1-Trichloroethane	0.50	94
Benzene	0.50	106
Trichloroethene	0.50	92
Toluene	0.50	96
Tetrachloroethene	0.50	90
m,p-Xylene	0.50	99
o-Xylene	0.50	95
Acetone	2.0	106

<u>Surrogates</u>	% Reco	<u>Method Limits</u>
Octafluorotoluene	97	
Toluene-d8	100	그 그는 그는 그를 가득하셨다면 화를 하게 되었다면 하는데 하는데 그를 하는데 그 그리고 있다.
4-Bromofluorobenzene	104	그는 그는 사람은 그는 사람들이 가장 하는 사람들이 되었다. 그 그 그 그는 그는 그는 그를 모르는 것이 되었다.

SAMPLE NAME: Lab Blank ID#: 9509133A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091604 Date of Collection: NA	Activities and and
File Name: 9091604 Date of Collection: NA	38968 557 P. K. S. S.
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	00 YO COMPLY TO A TOWN TO
	9/25/38/85/84
Dil. Factor: 1.0 Date of Analysis: 9/16/95	STATE OF THE STATE
Dil. Factor: 1.0 Date of Analysis: 9/16/95	
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and Applications of the Control of t	3477 SER 081 F 14
	5 (COC) 0000 (Stored Co.
Analyst's Initials: BJM	1669 Co. 1799
ADDIVSTS IDITIALS:	a sales i em ascara
	2000 XX 3000 X

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

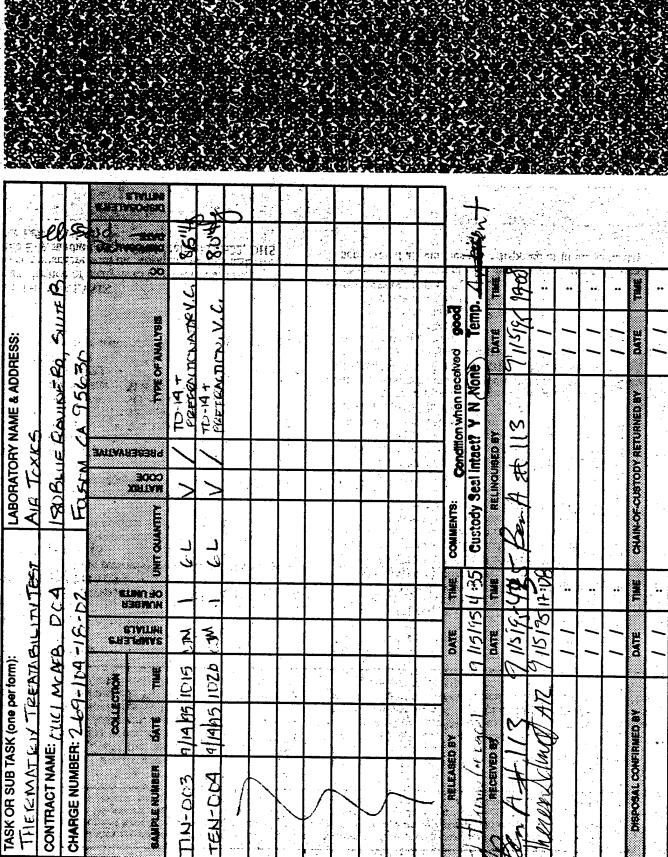
<u>Surrogates</u>	%	Recovery Method Limits
Octafluorotoluene		94 70-130
Toluene-d8		104 70-130
4-Bromofluorobenzene		100 70-130

9509133 4

CORPORATION **CHAIN OF CUSTODY RECORD**

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 98627 (916) 362-5332

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK



CSA

5842

ABITE - COODDINATOR / GAI PENDOD - DOLICAT NIDECTADA DINA SAMBI E PONTON / VEH MM - LABORATOR / DH

...



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509133B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8037

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/15/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/22/95

AMOUNT\$: \$100.00

		RECEIPT			
FRACTION#	<u>NAME</u>	<u>TEST</u>	VAC/PRES.	PRICE	
01A	TIN-003	Mod. Method 18	8.5 "Hg	\$50.00	
02A	TEN-004	Mod. Method 18	8.0 "Hg	\$50.00	
03A	Method Spike	Mod. Method 18	NA	NC	
04A	Lab Blank	Mod. Method 18	NA	NC	

John John

CERTIFIED BY: Sensa Silfuma

Laboratory Director

DATE: 9/22/95

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Amount	(ppbv) 2400	Not Detected	Not Detected	% Recovery	94
Det. Limit	(ppov) 95	120	50	L	50
Dilution	1.9	2.4	1.0		1.0
Analyzed	Vinyl Chloride	Vinyl Chloride	Vinyl Chloride		Vinyl Chloride
Sample	9/14/95	9/14/95	NA		NA NA
File	A091803	A091804	A091802		A091801
Lab Sample I.D.	9509133B-01A	9509133B-02A	9509133B-04A		9509133B-03A
Field Sample I.D.	TIN-003	TEN-004	Lab Blank	Spiked Sample	Method Spike

Comments: NA = Not Applicable

Analysis Date: 9/18/95 Container Type: 6 Liter Summa Canister

Analyst's Initials: JS

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PHESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

GORPORATION (916) 362-5332

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10395 OLD PLACERVILLE HOAD, SACRAMENTO, CA 95827

STATTINE DISPOSALER'S 854 SC. DISPOSAL (P.C.) TIME Suit P. good Temp. PEFFUNITION AND Y CREDEACTICALV.C. TYPE OF ANALYSIS DATE DATE Condition with raccivad LABORATORY NAME & ADDRESS: 1808LUE ROMINE RO 9562 Custady Soal intact? Y N Mond CHAIN-OF-CUSTODY RETURNED BY **717-14** 77-14 113 RELINQUISED BY AIR TOXKA PRESERVATIVE MATRIX CODE COMMENTS: **UNIT QUANTITY** <u>ين</u> TIME 16/2/11/08 THE CHANTEN TREFINENCIALITY TEST NUMBER OF UNITS 4 115/15 2 DATE DATE DATE CCT Ź, SJAITINI Z SAMPLER'S CONTRACT NAME: (11(1 MCAFE) CHARGE NUMBER: 24.9-104 9/11/5/11/20 5 5 TASK OR SUB TASK (one per form) TIME COLLECTION DISPOSAL CONFIRMED BY 1/14/15 DATE RELEASED BY RECEIVED BY SAMPLE NUMBER F30114 3 1111-003 AXX AXX

WILLE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509167A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

FAX:

916-362-5332

916-362-2318

DATE RECEIVED:

9/19/95

DATE COMPLETED: 9/29/95

INVOICE #8118

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION #	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-005	TO-14	9.0 "Hg	\$205.00
02A	TEN-006	TO-14	12 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

CERTIFIED BY

Laboratory Director

SAMPLE NAME: TIN-005 ID#: 9509167A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	9091923 Date of Collection: 9/19/95	
Dil. Factor:	3800 Date of Analysis: 9/20/95	
Analyst's Initials:	FA .	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1900	Not Detected
1,1-Dichloroethene	1900	Not Detected
Freon 113	1900	Not Detected
cis-1,2-Dichloroethene	1900	17000
Chloroform	1900	Not Detected
1,1,1-Trichloroethane	1900	Not Detected
Benzene	1900	2800
Trichloroethene	1900	570000
Toluene	1900	Not Detected
Tetrachioroethene	1900	Not Detected
m,p-Xylene	1900	7700
o-Xylene	1900	6300
Acetone	7600	Not Detected

Surrogates	% Recovery Method Limits
Octafluorotoluene	92 70-130
Toluene-d8	99 70-130
4-Bromofluorobenze	그는 그

SAMPLE NAME: TEN-006 ID#: 9509167A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9091929 Date of Collection: 9/19/95
Dil. Factor: 7.4 Date of Analysis: 9/20/95
Analyst's initials: LTS

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	3.7	Not Detected
1,1-Dichloroethene	3.7	Not Detected
Freon 113	3.7	Not Detected
cis-1,2-Dichloroethene	3.7	4.0
Chloroform	3.7	Not Detected
1,1,1-Trichloroethane	3.7	Not Detected
Benzene	3.7	Not Detected
Trichloroethene	3.7	110
Toluene	3.7	Not Detected
Tetrachloroethene	3.7	Not Detected
m,p-Xylene	3.7	4.2
o-Xylene	3.7	Not Detected
Acetone	15	38

Surrogates	% Recovery Method Limits	É
Octafluorotoluene	91 70-130	٠.
Toluene-d8	100 70-130	
4-Bromofluoroben:	ene 98 70-130	

SAMPLE NAME: Method Spike ID#: 9509167A-03A

EPA METHOD TO-14 GC/MS Full Scan

The second secon	
File Name: 9091917	Date of Collection: NA
File Name: 9091917	Data of Collection, MA
	Date of Collection: NA
Dil. Factor:	
Dii. racior.	Date of Analysis: 9/20/95
	Date Of Affaits 3/20/30
Anglyet's initials.	
Analyst's Initials:	
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Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	125
1,1-Dichloroethene	0.50	102
Freon 113	0.50	100
cis-1,2-Dichloroethene	0.50	94
Chloroform	0.50	94
1,1,1-Trichloroethane	0.50	95
Benzene	0.50	103
Trichloroethene	0.50	91
Toluene	0.50	91
Tetrachloroethene	0.50	85
m,p-Xylene	0.50	99
o-Xylene	0.50	100
Acetone	2.0	95

Surrogates %	Recovery Method Limits
Octafluorotoluene	92 70-130
Toluene-d8	99 70-130
4-Bromofluorobenzene	99 70-130

SAMPLE NAME: Lab Blank ID#: 9509167A-04A

EPA METHOD TO-14 GC/MS Full Scan

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File Name:	9091920 Date of Collection: NA	Walter Co.
ine itallie.	Date of Concoron, 14A	200 Mg 1 1
		N. Carlotte
Dil. Factor:	1.0 Date of Analysis: 9/20/95	60 980 No
Dir. Factor.	1.0 Date Of Alialysis. 3/20/33	1745an 772.
and the control of the first of the second of the control of the c		A Section
Analyst's initials:	- TERROR	11 Sept. 12
Analysta miliais.		

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Surrogates	% Recovery Method Limits	
Octafluorotoluene	95 70-130	
Toluene-d8	99 70-130	
4-Bromofluoroben	ene 89 70-130	

9509167

CHAIN OF CUSTODY RECORD

CORPORATION
10396 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95627
(916) 362-6332

5843

7 7 36/6/16 LABORATORY NAME & ADDRESS: JIN-465 11 PAUL 12 05421 CHAIN-OF-CUSTODY RETURNED BY RELINGUISED BY PRESERVATIVE SOCO MYLLBLX COMMENTS: **SELECTION** 13:22 7.0 ol nate Montre 19 15 19195

DATE

RELEABED BY

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECENT

DATE

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USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK TASK OR SUB TASK (one per form) CONTRACT NAME: 711 (CHARGE NUMBER: THEE MATE Y

21-0-11-15

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509167B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8118

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/19/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/29/95

AMOUNT\$: \$100.00

			RECEIPT	
FRACTION#	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-005	Mod. Method 18	9.0 "Hg	\$50.00
02A	TEN-006	Mod. Method 18	12 "Hg	\$50.00
03A	Method Spike	Mod. Method 18	NA	NC
04A	Lab Blank	Mod. Method 18	. NA	NC

10 12/02 Troum

CERTIFIED BY Andold I Su

Laboratory Director

DATE:____

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Diali			•				
C - C - C - C - C - C - C - C - C - C -	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(vdaa)	(vdaa)
TIN-005	9509167B-01A	A092007	9/19/95	Vinyl Chloride	1.9	95	2500
TEN-006	9509167B-02A	A092008	9/19/95	Vinyl Chloride	2.3	110	Not Detected
Lab Blank	9509167B-04A	A092006	A N	Vinyl Chloride	1.0	20	Not Detected
Spiked Sample						L	% Recovery
Method Spike	9509167B-03A	A092005	NA	Vinyl Chloride	1.0	50	100

Analysis Date: 9/20/95

Comments: NA = Not Applicable

Container Type: 6 Liter Summa Canister Analyst's Initials: JS & SPM

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 (916) 362-5332

5843

STATTINI 141 TIME ဘ TIME 561616 V.C. DETECTOD IN TO-14 PREFERENTIALVICA TYPE OF ANALYSIS DATE DATE LABORATORY NAME & ADDRESS: 71 - 445 SC FILE RAUNE DO CHAIN-OF-CUSTODY RETURNED BY RELINGUISED BY ALR TEXICS PRESERVATIVE MATRIX COMMENTS **UNIT QUANTITY** 13:22 <u>0</u> TIME TIME иомвея Оғ иипз 56/6/ CONTRACT NAME: (1) (1, MCNF., E.C.A DATE DATE DATE Σ, BJAITINI 13 CHARGE NUMBER: 24-9-11-4-15 S.HELFR'S THE MANEY TEERINDELITY 16967 496-15461 TASK OR SUB TASK (one per form) HE COLLECTION 南 DISPOSAL CONFIRMED BY 111/1/15 アンとのと DATE RELEASED BY RECEIVED BY SAMPLE NUMBER TINI- 1145 1EN-1016

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COMMINIATION / COLI PIRINDIA - BRO IECT DIRECTOR / PINK - SAMPI F CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY / JECEPT



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509181A

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation P.O. Box 201088

10389 Old Placerville Road

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8121

FAX:

916-362-2318

P.O. # 259699

DATE RECEIVED:

9/20/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/29/95

AMOUNT\$: \$615.00

RECEIPT

FRACTION #	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-007	TO-14	10.5 "Hg	\$205.00
02A	TIX-008	TO-14	7.5 "Hg	\$205.00
03A	TEN-009	TO-14	10.5 "Hg	\$205.00
04A	Method Spike	TO-14	NA	NC
05A	Lab Blank	TO-14	NA	NC

Laboratory Director

SAMPLE NAME: TIN-007 ID#: 9509181A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	1092110 Date of Collection: 9/20/95	11/ 4mil
Dil. Factor:	2700 Date of Analysis: 9/22/95	
Analyst's Initials:	FA	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1400	Not Detected
1,1-Dichloroethene	1400	Not Detected
Freon 113	1400	Not Detected
cis-1,2-Dichloroethene	1400	11000
Chloroform	1400	Not Detected
1,1,1-Trichloroethane	1400	Not Detected
Benzene	1400	1800
Trichloroethene	1400	360000
Toluene	1400	Not Detected
Tetrachloroethene	1400	Not Detected
m,p-Xylene	1400	4300
o-Xylene	1400	2600
Acetone	5400	Not Detected

<u>Surrogates</u>	% Recovery Method Limits	
Octafluorotoluene	109 70-130	
Toluene-d8	84 70-130	
4-Bromofluorobena		

SAMPLE NAME: TIX-008 ID#: 9509181A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1092111 Date of Collection: 9/20/95
Dil. Factor: 2400 Date of Analysis: 9/22/95
Analyst's Initials: FA

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1200	Not Detected
1.1-Dichloroethene	1200	Not Detected
Freon 113	1200	Not Detected
cis-1,2-Dichloroethene	1200	12000
Chloroform	1200	1400
1,1,1-Trichloroethane	1200	Not Detected
Benzene	1200	1900
Trichloroethene	1200	360000
Toluene	1200	Not Detected
Tetrachloroethene	1200	Not Detected
m,p-Xylene	1200	4700
o-Xylene	1200	3100 >
Acetone	4800	Not Detected

Surrogates	% Recovery Method	Limits
Octafluorotoluene	116	130
Toluene-d8	70-1	130
4-Bromofluorobenzen	97 70-1	130

SAMPLE NAME: TEN-009 ID#: 9509181A-03A

EPA METHOD TO-14 GC/MS Full Scan

and the second s	
File Name: 1092112	
File Name: 1092112	Date of Collection: 9/20/95
4	Pare Of Collections, 3/20/35
Dil. Factor: 5.9	
Dii. Factor: 59	Date of Analysis: 9/22/95
그 그 가게 그 여자는 이 그를 느낌하게 모습니다. 사람들이 그는 이 약속에게 없어요. 그릇이	Date Of Allarysis. 3/22/30
Analyst's Initials: SPM	
Analyst's initials: SPM	그리다 아이가 내용하다. 나는 사람들은 중요한 사람들이 얼굴을 하지만 하게 되었다면 하는데 그 사람들은 생각이 되었다. 그는 때
- 17 - 17 - 17 - 17 - 17 - 17 - 18 - 18	하는 그들은 하는 내가 있다면서 있는 아름이 살아왔다. 얼마를 살아가 되었다면서 하는 것이 되었다면 살아가 되었다. 그 그래요?

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	3.0	Not Detected
1,1-Dichloroethene	3.0	Not Detected
Freon 113	3.0	Not Detected
cis-1,2-Dichloroethene	3.0	8.7
Chloroform	3.0	Not Detected
1,1,1-Trichloroethane	3.0	Not Detected
Benzene	3.0	Not Detected
Trichloroethene	3.0	250
Toluene	3.0	Not Detected
Tetrachloroethene	3.0	Not Detected
n,p-Xylene	3.0	3.3
o-Xylene	3.0	Not Detected
Acetone	12	Not Detected 5

<u>Surrogates</u>	% Recovery Met	hod Limits
Octafluorotoluene		70-130
Toluene-d8		70-130 70-130
4-Bromofluorobenzene		
the second section of the second section	~	70-130

SAMPLE NAME: Method Spike ID#: 9509181A-04A

EPA METHOD TO-14 GC/MS Full Scan

Analyst's Initials:	File Name: Dil. Factor: Analyst's Initials:	1092104 Date of Collection: NA 1.0 Date of Analysis: 9/21/95 EV
---------------------	---	---

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	71
1,1-Dichloroethene	0.50	77
Freon 113	0.50	91
cis-1.2-Dichloroethene	0.50	77
Chloroform	0.50	87
1,1,1-Trichloroethane	0.50	76
Benzene	0.50	73
Trichloroethene	0.50	85
Toluene	0.50	73
Tetrachloroethene	0.50	95
m,p-Xylene	0.50	78 /
o-Xylene	0.50	61 Q √
Acetone	2.0	134

Q = Exceeds Quality Control limits.

<u>Surrogates</u>		%	Recovery Method Limits
Octafluorotoluene			109 70-130
Toluene-d8	and Section		85 70-130
4-Bromofluorobenz	ene		97 70-130

SAMPLE NAME: Lab Blank ID#: 9509181A-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1092106 Date of Collection, MA	
File Name: 1092106 Date of Collection: NA	
rile Name: 1092106 Date of Collection: NA	
Dil. Factor: 1.0 Pote of Avaluate Comme	
Dil. Factor: 1.0 Date of Analysis: 9/21/95	
Analyst's initials: EV	
Analyst's Initials:	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	114 70-130
Toluene-d8	85 70-130
4-Bromofluorobenzene	92 70-130
	70-130

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

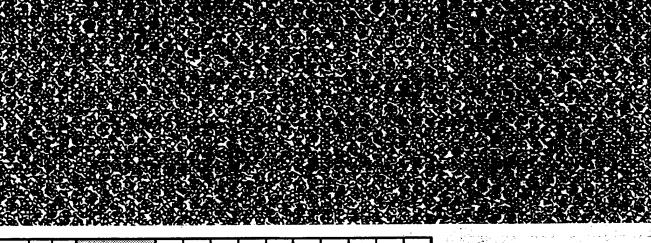
CORPORATION
10396 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95627
(916) 362-5332

5847

STYLLM ž 7.5. 9 20 Pr TYPE OF ANALYBIS LABORATORY NAME & ADDRESS: A) Pulle Pans - Ko CHAIN-OF-CUSTODY RETURNED BY レーロ MATRIX GOOS COMMENTS 7.2 Pelis 9 POPS CONTRACT NAME: CHILL MCDE B. DLA 1 Izative CHARGE NUMBER: 749-114-16-02 THE EMAIL IN TREMTABLLING TEST DATE annerens Annerens * TASK OR SUB TASK (one per form) 1040 į イを 92,195 ş しかジー GAMPLE MUNIER \mathbf{Z} 万と

020

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / VELLOW - LABORATORY / BLUE - LABORATORY RECEIPT CUSTODY SCOI INTECT? Y N NONE (WITCH) ADDITIONAL CONTROL CONTROL





AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509181B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8121

FAX:

916-362-2318

P.O. # 259699

DATE RECEIVED:

9/20/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/29/95

AMOUNT\$: \$150.00

			RECEIPT	
FRACTION#	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-007	Mod. Method 18	10.5 "Hg	\$50.00
02A	TIX-008	Mod. Method 18	7.5 "Hg	\$50.00
03A	TEN-009	Mod. Method 18	10.5 "Hg	\$50.00
04A	Method Spike	Mod. Method 18	NA	NC
05A	Lab Blank	Mod. Method 18	NA	NC

The San

CERTIFIED BY?

Laboratory Director

DATE: 9/99/95

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(Addd)	(Agaa)
LIN-007	9509181B-01A	A092106	9/20/95	Vinyl Chloride	2.1	110	1800
1X-008	9509181B-02A	A092107	9/20/95	Vinyl Chloride	1.8	06	1700
TEN-009	9509181B-03A	A092109	9/20/95	Vinyl Chloride	2.1	110	Not Detected
Lab Blank	9509181B-05A	A092103	AN	Vinyl Chloride	1.0	20	Not Detected
Spiked Sample							% Recovery
Method Spike	9509181B-04A	A092102	AN	Vinyl Chloride	1.0	50	92

Analysis Date: 9/21/95

Comments: NA = Not Applicable

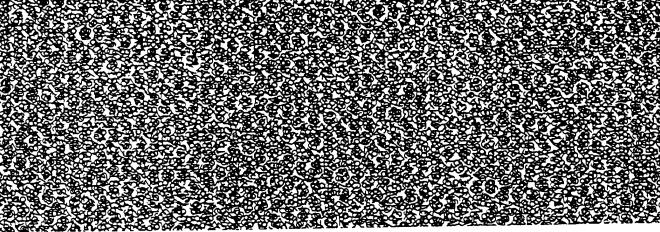
Container Type: 6 Liter Summa Canister Analyst's Initials: SPM

5847

CORPORATION
10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 CHAIN OF CUSTODY RECORD

(916) 362-5332

STATTINI DISPOSALER'S <u>ر</u> زر DATE 2.5 PRESENTINY 1 28 82 PEFENTINN DATE TYPE OF ANALYBIS LABORATORY NAME & ADDRESS: PAUNE BO <u>マ</u>-5 RELINGUISED BY AIR TOXICS **BYTTAY R323R9** A) PILIE MATRIX CODE COMMENTS: **UNIT OUANTITY** 791 14:00 27.7 TIME TIME NUMBER OF UNITS 170 175 SIPAL CONTRACT NAME: (31/L) MCNE B. DLA 152T DATE DATE CHARGE NUMBER: 249-11-4-15-0 VE) **EJAITINI** SAMPLER'S 120/15/1920 THE EMAIL ! TRENDBILLIN 1/2/05/1930 USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK 9 74 95 1040 TASK OR SUB TASK (one per form): TIME COLLECTION DATE 11 21 RELEASED BY RECEIVED BY REN - UNG SAMPLE NUMBER 711 Y - Will B (



ANTHOUGH AND DATORNATHE LANDONATORN RECEIPT

TIME

DATE

CHAIN-OF-CUSTODY RETURNED BY

TIME

DATE

DISPOSAL CONFIRMED BY

Peally

7 AT

SAMPLE NAME: TIN-010 Duplicate

ID#: 9509210A-01B

EPA METHOD TO-14 GC/MS Full Scan

File Name: Dil. Factor:	9092	!526 980	ollection: 9/21 nalysis: 9/26/9	0.8888. ±0.26.30 (4.677. July 1.17
Analyst's Initials:	E	BJM		

Compound	Det. Limit (ppbv)	Amount (ppbv)	RPD
Vinyl Chloride	490	2800	NA
1,1-Dichloroethene	490	Not Detected	NA
Freon 113	490	Not Detected	NA
cis-1,2-Dichloroethene	490	21000	4.9
Chloroform	490	1900	17
1,1,1-Trichloroethane	490	Not Detected	NA
Benzene	490	3300	0
Trichloroethene	490	> 660000 S > +	3.1
Toluene	490	1300	14
Tetrachloroethene	490	Not Detected	NA
m,p-Xylene	490	7400	14
o-Xylene	490	6200	19
Acetone	2000	Not Detected	NA

S = Saturated peak; data reported as estimated.

Surrogates	% Recovery Method Limits
Octafluorotoluene	97 70-130
Toluene-d8	99 70-130
4-Bromofluorobenzene	98 70-130

SAMPLE NAME: TEN-011 ID#: 9509210A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: Dil. Factor:	909252 2.	te of Collection te of Analysis:	
Analyst's Initials:	BJI		

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.1	Not Detected
1,1-Dichloroethene	1.1	Not Detected
Freon 113	1.1	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected
Chloroform	1.1	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected
Benzene	1.1	Not Detected
Trichloroethene	1.1	Not Detected
Toluene	1.1	Not Detected
Tetrachloroethene	1.1	Not Detected
m,p-Xylene	1.1	Not Detected
o-Xylene	1.1	Not Detected
Acetone	4.2	9.5

Surrogates	% Recovery Method Limi	its
Octafluorotoluene	98 70-130	
Toluene-d8	70-130	
4-Bromofluorobenzer	e 97	

SAMPLE NAME: TEN-012 ID#: 9509210A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9092525 Date of Collection: 9/22/95
Dil. Factor: 3.2 Date of Analysis: 9/26/95
Analyst's Initials: BJM

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.6	Not Detected
1,1-Dichloroethene	1.6	Not Detected
Freon 113	1.6	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected
Chloroform	1.6	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected
Benzene	1.6	Not Detected
Trichloroethene	1.6	Not Detected
Toluene	1.6	Not Detected
Tetrachloroethene	1.6	Not Detected
m,p-Xylene	1.6	Not Detected
o-Xylene	1.6	Not Detected
Acetone	6.4	Not Detected

Surrogates % Recovery Me	thod Limits
Octafluorotoluene 100	70-130
Toluene-d8 100	70-130
4-Bromofluorobenzene 96	70-130

SAMPLE NAME: TIN-013 ID#: 9509210A-04A

EPA METHOD TO-14 GC/MS Full Scan

PRODUCT OF THE PROPERTY OF THE SECOND OF THE		Country (Service) (1.5), the main relation to recommendation where	997 T 786 278 T 107 T 108 288 T 107
File Name:	9092528	Date of C	ollection: 9/22/95
Dil. Factor:	3500		TX - 1
	3500	Date of A	nalysis: 9/26/95
Analyst's Initials:	BJM		

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1800	Not Detected
1,1-Dichloroethene	1800	Not Detected
Freon 113	1800	Not Detected
cis-1,2-Dichloroethene	1800	18000
Chloroform	1800	1800
1,1,1-Trichloroethane	1800	Not Detected
Benzene	1800	3000
Trichloroethene	1800	620000 E 🕽 🕂
Toluene	1800	Not Detected
Tetrachloroethene	1800	Not Detected
m,p-Xylene	1800	6000
o-Xylene	1800	4600
Acetone	7000	Not Detected

E = Exceeds instrument calibration range, but within linear range.

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	70-130
Toluene-d8	70-130
4-Bromofluorobenzene	96 70-130

SAMPLE NAME: Method Spike ID#: 9509210A-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9092518 Dil. Factor: 1.0 Analyst's initials: EV
--

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	119
1,1-Dichloroethene	0.50	106
Freon 113	0.50	104
cis-1,2-Dichloroethene	0.50	101
Chloroform	0.50	100
1,1,1-Trichloroethane	0.50	100
Benzene	0.50	109
Trichloroethene	0.50	99
Toluene	0.50	100
Tetrachloroethene	0.50	94
m,p-Xylene	0.50	108
o-Xylene	0.50	109
Acetone	2.0	108

Surrogates %	Recovery Method Limits
Octafluorotoluene	99 70-130
Toluene-d8	104 70-130
4-Bromofluorobenzene	100 70-130

SAMPLE NAME: Lab Blank ID#: 9509210A-06A

EPA METHOD TO-14 GC/MS Full Scan

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-	11 - At		[444 - 이로봇이라 중앙 70	specie and an experience of	1 1 1 1 1 1 1 1 1 1 1 1	Presidential anacheatain	10010000000000000000000000000000000000	- 120,00039.546554.00.00.00.00.00.00.00.00.00.00.00.00.00	وريدرونيد تغرار والدامين	discount by the contract section
-	ile Name:	 49 (6) 33 (3) 13, 234. 		9092520	1		Tata at C	ollection	ATA .	
₹,,				JOJECE	200 m of 100 miles	1993099.08.009.50	vale of C	onection	: NA	143836983783865 - 6114 - 1
_					Au 1 0.333	8 9 9 8 4 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SPY (B. M. FOREIT LANGE OF	attach as Levi Jews	C. 10 10 30 10 10 10 10 10 10 10 10 10 10 10 10 10	
	il. Factor:			- A		60/3905A066		1922-1941 (M. 1886)		河布, 医克朗尼皮氏管 闭门
	m r dotor.	그의 경영 생각을 받다		**************************************			Jate of A	nalysis:	9/25/95	n fast burgarjana in in
			그는 이 사람들이 하셨다면서					, 0.0.		
	nalyst's in	minte.					CV 1. 1822 (1821) Visite		A Section 18 Section 18	LASSA AKO SA
_	maiyst & m	iuais:	[14] Vote USS, 44(1) 198(2) V.	81600 84 W - F	Committee Control	288. 80227 V W.1102 OA.		ar som Helen skrive	hodički i Subic	
15%	After the following the second	3677-7531-21,00%	Janu 33 & 10 544	er conflicted transfer to the conflicted to	2010		Same College and the same of t	BUNDON CONTRACTOR	似黑黑 雙毛 化原色红	

Compound	Det. Limit (ppbv)	Amount (ppbv)	
Vinyl Chloride	0.50	Not Detected	
1,1-Dichloroethene	0.50	Not Detected	
Freon 113	0.50	Not Detected	
cis-1,2-Dichloroethene	0.50	Not Detected	
Chloroform	0.50	Not Detected	
1,1,1-Trichloroethane	0.50	Not Detected	
Benzene	0.50	Not Detected	
Trichloroethene	0.50	Not Detected	
Toluene	0.50	Not Detected	
Tetrachloroethene	0.50	Not Detected	
m,p-Xylene	0.50	Not Detected	
o-Xylene	0.50	Not Detected	
Acetone	2.0	Not Detected	

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	98 70-130
Toluene-d8	100 70-130
4-Bromofluorobenzene	

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

C R P O R A T I O M 10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 (916) 362-5332

5848

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ACCEPTANCE OF THE PARTY OF THE													MANAGE AND								
				DATE OF THE PARTY	4.5.1	10.5 Mg	4.5.46	9,5%				4	emp. Hucky	Zt E	7.0	este se					
	RESS: (7)	NE RD, STE	96630	TYPE OF ANALYSIS	10-14, Protection V.C.	cted in TIME	17211-013	Puter U.C.				(? Y NAMone	100 P	DATE . TIME	FENDAY		 . / /	. 11	DATE TIME	: / /
	LABORATORY NAME & ADDRESS:	SCUE RAVINE	40m, CA 9	SHEBENATIVE	1	J. 12-11/1 -	TO 10 716	10-MP			- 2		Custody Seal intact?	Condition when received	RELINOUBEDAY	My Py			·	-CUSTODY RETURNED BY	
(010)		(%0	101	MATTAN MATTAN 3000	8	bliter (N	6 liter (N	12 Liter (1)					COMMENTS:							CHAIN-OF-CUST	
	m): \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1188, DO	40-8/-	STIAITH STAITH STIMU *C	_	GAF 1 (7 1 345	1 1 JUS		:			DATE TIME	30.1 54.14	DATE TIME	\$ / SUZI	-		REAT BISO	DATE TIME	
THIS FORM ARE ON THE BACK	TASK OR SUB TASK (one per form):	1	CHARGE NUMBER: 3 69-164	BAAUDE E MINNEES SATE THE	121/2 CO. 1	11/21/90 C/2 O	16 N-012 1/2/45 0845	1 IN- 613 1121/85 0950					RELEASED BY D	6 130		6 6			of Wall Call AT	DSPOSAL CONFIRMED BY D	

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Condition when recovery WHITE. COORDINATOR / GOLDENROD. PROJECT DIRECTOR / PINK. SAMPLE CONTROL / YELLOW-LABORATORY / BLUE. LABORATORY RECEIPT

CUSTORY Seal Intact? Y IN MONO. Temp. And factory receipt



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509210B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8123

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/22/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

929/95

AMOUNT\$: \$250.00

			RECEIPT	
FRACTION #	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-010	Mod. Method 18	9.5 "Hg	\$50.00
01B	TIN-010 Duplicate	Mod. Method 18	9.5 "Hg	\$50.00
02A	TEN-011	Mod. Method 18	10.5 "Hg	\$50.00
03A	TEN-012	Mod. Method 18	9.0 "Hg	\$50.00
04A	TIN-013	Mod. Method 18	9.0 "Hg	\$50.00
05A	Method Spike	Mod. Method 18	NA	NC
06A	Lab Blank	Mod. Method 18	NA	NC
06B	Lab Blank	Mod. Method 18	NA	NC

CERTIFIED BY: Jando J. Kruman

Laboratory Director

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Name Date For Factor (ppbv) (ppbv) RPD A092606 9/21/95 Vinyl Chloride 2.0 100 2700 NA A092727 9/21/95 Vinyl Chloride 2.1 110 Not Detected NA A092607 9/22/95 Vinyl Chloride 1.9 95 Not Detected NA A092603 NA Vinyl Chloride 1.0 50 Not Detected NA A092709 NA Vinyl Chloride 1.0 50 Not Detected NA A092601 NA Vinyl Chloride 1.0 50 Not Detected NA A092709 NA Vinyl Chloride 1.0 50 Not Detected NA A092601 NA Vinyl Chloride 1.0 50 Not Detected NA	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount	
9/21/95 Vinyl Chloride 2.0 100 2700 9/21/95 Vinyl Chloride 2.1 110 Not Detected 9/22/95 Vinyl Chloride 1.9 95 Not Detected NA Vinyl Chloride 1.9 95 2500 NA Vinyl Chloride 1.0 50 Not Detected		Name	Date	For	Factor	(nddd)	(vqdd)	RPD
9/21/95 Vinyl Chloride 2.0 100 2100 9/21/95 Vinyl Chloride 2.1 110 Not Detected 9/22/95 Vinyl Chloride 1.9 95 Not Detected NA Vinyl Chloride 1.0 50 Not Detected		A092606	9/21/95	Vinyl Chloride	2.0	100	2700	Ą
9/21/95 Vinyl Chloride 2.1 110 Not Detected 9/22/95 Vinyl Chloride 1.9 95 Not Detected 9/22/95 Vinyl Chloride 1.9 95 2500 NA Vinyl Chloride 1.0 50 Not Detected		A092727	9/21/95	Vinyl Chloride	2.0	100	2100	25
9/22/95 Vinyl Chloride 1.9 95 Not Detected 9/22/95 Vinyl Chloride 1.9 95 2500 NA Vinyl Chloride 1.0 50 Not Detected NA Vinyl Chloride 1.0 50 Not Detected NA Vinyl Chloride 1.0 50 Not Detected		A092607	9/21/95	Vinyl Chloride	2.1	110	Not Detected	Ą
9/22/95 Vinyl Chloride 1.9 95 2500 NA Vinyl Chloride 1.0 50 Not Detected NA Vinyl Chloride 1.0 50 Not Detected NA Vinyl Chloride 1.0 50 103		A092609	9/22/95	Vinyl Chloride	1.9	95	Not Detected	A
NA Vinyl Chloride 1.0 50 Not Detected NA Vinyl Chloride 1.0 50 Not Detected **Recovery** NA Vinyl Chloride 1.0 50 103		A092610	9/22/95	Vinyl Chloride	1.9	95	2500	A A
NA Vinyl Chloride 1.0 50 Not Detected **Recovery** NA Vinyl Chloride 1.0 50 103		A092603	N A	Vinyl Chloride	1.0	20	Not Detected	N A
NA Vinyl Chloride 1.0 50 103		A092709	N A	Vinyl Chloride	1.0	20	Not Detected	Ą
NA Vinyl Chloride 1.0 50 103							% Recovery	
		A092601	NA	Vinyl Chloride	1.0	50	103	AN

Analysis Date: 9/26/95 & 9/27/95

Comments: NA = Not Applicable

Container Type: 6 Liter Summa Canister

Analyst's Initials: JS

5848

KADIAN CORPORATION CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 (916) 362-5332

STATTINI SHE IASOGSIO -Right B 0.5% 4.0% emp. BIAG Ü **жеочэ**ю 190 BLUE RAVINE AP, ST 10-14, Pirlestion V.C 10-14, Profection V. C. 10.11 Piel 11 UC. (010) TO-14 Plaked U.C. Custody Seal intact? Y NAMone poop 95630 TYPE OF ANALYSIS DATE LABORATORY NAME & ADDRESS: Condition when received SIXIL MIL ¢ RELINGUISED 6Y SCAN MATRIX 3 2 3 COMMENTS: **UNIT QUANTITY** 6. Ritar oliter Licr 6 liter 181118111111 400 ¥ 9 TIME TIME OF UNITS ŧ NUMBER <u>ر</u> 511 rd 6 CONTRACT NAME: OUC / Pro 11 FB SAF SAF DATE **EJAITINI** 3 DATE ١ C.P. SAMPLER'S 401-1/27/55 ps so 01.0 0.7.0 2480 3416/1 TASK OR SUB TASK (one per form) TIME \ COLLECTION 761 5 RMAIRIX Ash elel 1/21/90 DATE 1111 (x10 RELEASED BY RECEIVED BY CHARGE NUMBER: 110-017 7/0-N 11 SAMPLE NUMBER É 7. _ 03A

WHITE COCHDINATOR / GOLDENHOD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

TIME

DATE

CHAIN-OF-CUSTODY RETURNED BY

TIME 13.30

DATE

DISPOSAL CONFIGMED BY

BE

0

CAT.



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509235A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

FAX:

916-362-2318

DATE RECEIVED:

9/25/95

DATE COMPLETED:

9/29/95

INVOICE # 8125

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION #	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-014	TO-14	9.0 "Hg	\$205.00
02A	TEN-015	TO-14	9.0 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

CERTIFIED BY

Laboratory Director

SAMPLE NAME: TIN-014 ID#: 9509235A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:		9092624	h _{all}
Dil. Factor:		3800	
Analyst's in	itials:	LTS	

Date of Collection: 9/25/95
Date of Analysis: 9/26/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1900	Not Detected
1,1-Dichloroethene	1900	Not Detected
Freon 113	1900	Not Detected
cis-1,2-Dichloroethene	1900	16000
Chloroform	1900	Not Detected
1,1,1-Trichloroethane	1900	Not Detected
Benzene	1900	2300
Trichloroethene	1900	540000
Toluene	1900	Not Detected
Tetrachloroethene	1900	Not Detected
m,p-Xylene	1900	4800
o-Xylene	1900	3400
Acetone	7600	Not Detected

Surrogates	회 이번호 보니	% Recovery Method Limits
Octafluorotoluene		98 70-130
Toluene-d8		101 70-130
4-Bromofluorobenzene	A Alamana	98 70-130

SAMPLE NAME: TEN-015 ID#: 9509235A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9092625 Dil. Factor: 6.4	Date of Collection: 9/25/95 Date of Analysis: 9/26/95
Analyst's initials: LTS	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	3.2	Not Detected
1.1-Dichloroethene	3.2	Not Detected
Freon 113	3.2	Not Detected
cis-1,2-Dichloroethene	3.2	Not Detected
Chloroform	3.2	Not Detected
1,1,1-Trichloroethane	3.2	Not Detected
Benzene	3.2	Not Detected
Trichloroethene	3.2	Not Detected
Toluene	3.2	Not Detected
Tetrachloroethene	3.2	Not Detected
m,p-Xylene	3.2	Not Detected
o-Xylene	3.2	Not Detected
Acetone	13	Not Detected

Surrogates	507 m 1 1 80 10	% Recovery Method Limits
Octafluorotoluene		100 70-130
Toluene-d8	1.1	105 70-130
4-Bromofluorobenz	zene	101 70-130

SAMPLE NAME: Method Spike ID#: 9509235A-03A

EPA METHOD TO-14 GC/MS Full Scan

Jac Ul Alialysis: 9/20/95	File Name: Dil. Factor:	9	092619	Date of Col	네트 트로스 아름다면 불쾌한 다시. 작성하셨다.
Analyst's initials:	Analyst's Initials:		1.0 EV	Date of Ana	ilysis: 9/26/95

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	129
1,1-Dichloroethene	0.50	104
Freon 113	0.50	102
cis-1,2-Dichloroethene	0.50	96
Chloroform	0.50	94
1,1,1-Trichloroethane	0.50	91
Benzene	0.50	106
Trichloroethene	0.50	91
Toluene	0.50	93
Tetrachloroethene	0.50	88
m,p-Xylene	0.50	106
o-Xylene	0.50	98
Acetone	2.0	100

Container Type: NA

Surrogates	% Recovery Method Limits
Octafluorotoluene	98 70-130
Toluene-d8	99 70-130
4-Bromofluorobenzene	99 70-130

SAMPLE NAME: Lab Blank ID#: 9509235A-04A

EPA METHOD TO-14 GC/MS Full Scan

	9.15
File Name: 9092621 Date of Collection: NA	Maria Committee
File Name: 9092621 Date of Collection: NA	500 y 10 y
	40.00
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	1867 P. 11 P. 1
	20 20 20 1
THE PARKET OF THE PROPERTY OF THE PROPERTY OF THE PARKET O	
Dil. Factor: 1.0 Date of Analysis: 9/26/95	
	1.00 5
	1.1
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■ 1. ■ 1. ■ 1. ■ 1. ■ 1. ■ 1. ■ 1. ■ 1.	4 Y 350
Analyst's initials:	200 200 400
AIDITOLO BIILIDO.	gerre e

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

Surrogates	% Recovery Method Limits	
Octafluorotoluene	98 70-130	
Toluene-d8	101 70-130	
4-Bromofluoroben	ene 99 70-130	

9509235

5849

CORPORATION

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827

(916) 362-5332

DVIE Disbosyr **30** Ħ Prefection V.C. ¥ good TYPE OF ANALYSIS DATE ABORATORY NAME & ADDRESS: プラカラ Pie CHAIN-OF-CUSTODY RETURNED BY 1014 Custody Seal intact? Y N)/ X RELINGUISED BY PRESERVATIVE MATRIX 3000 2 COMMENTS: 700 TIME 13.7 'n, . 6 0 11211 į 12-14 1 8 C SAMPLER'S 8 DATE 1-1171 ٤. REA ンガジ TASK OR SUB TASK (one per form) 77.35 SUC ૅ 2475 170 KININIX DISPOSAL CONFIRMED BY 9115 ガルトノアアル RECEIVED BY RELEASED BY CONTRACT NAME: CHARGE NUMBER: 111/2 5/3 3

NO

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509235B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8125

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/25/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

9/29/95

AMOUNT\$: \$100.00

			RECEIPI	
FRACTION#	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-014	Mod. Method 18	9.0 "Hg	\$50.00
02A	TEN-015	Mod. Method 18	9.0 "Hg	\$50.00
03A	Method Spike	Mod. Method 18	NA	NC
04A	Lab Blank	Mod. Method 18	NA	NC

CERTIFIED BY: Binds S. Truma

Laboratory Director

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(Addd)	(Addd)
TIN-014	9509235B-01A	A092613	9/25/95	Vinyl Chloride	1.9	95	2800
TEN-015	9509235B-02A	A092614	9/25/95	Vinyl Chloride	1.9	95	Not Detected
Lab Blank	9509235B-04A	A092603	Ą Z	Vinyl Chloride	1.0	20	Not Detected
Spiked Sample			:				% Recovery
Method Spike	9509235B-03A	A092601	NA	Vinyl Chloride	1.0	50	103

Comments: NA = Not Applicable

Analysis Date: 9/26/95 Container Type: 6 Liter Summa Canister Analyst's Initials: JS

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

E CORPORATION

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 (916) 362-5332

STATTINI S'REJAROGRIG DISPOSAL DATE သ TIME 1014, Profection V.C. Terrip. TYPE OF ANALYSIS DATE DATE Condition when receiver LABORATORY NAME & ADDRESS: 180 Blue Fours CHAIN-OF-CUSTODY RETURNED BY Z Circady See! Intest? Y RELINGUISED BY (Z) WATRIX CODE 2 VE COMMENTS: **UNIT OUANTITY** 400 ₩ ₩ 760 128946:27 TIME TIME REAINB11.11 40, NUMBER OF UNITS 71. SAF DATE DATE STAITIN **/ W** 5 1-101 0 S.HETIGMAS 5/180 5050 2 TASK OR SUB TASK (one per form) TIME COLLECTION CONTRACT NAME: OUC CHARGE NUMBER: 🤌 🂪 1919 5/15 1/1. DATE ルコメノイリリ RECEIVED BY RELEASED BY 1EN-615 The gard SAMPLE NUMBER

WHELE PRODUCED FOR DEBLOOD, FOOTECT DIRECTOR FRANCE FOREING 1 VELOW - LABORATORY FILLE - LABORATORY HECEIPT

TIME

DATE

DISPOSAL CONFIRMED BY

5849



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509271A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

PHONE:

FAX:

DATE RECEIVED:

DATE COMPLETED:

916-362-5332

916-362-2318 9/27/95

10/6/95

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

INVOICE # 8187

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION #	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-016	TO-14	9.5 "Hg	\$205.00
02A	TEN-017	TO-14	10.5 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

Laboratory Director

SAMPLE NAME: TIN-016 ID#: 9509271A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:		Name and the second
rue Rame:	9092723 Date of Collection: 9/27/95	
Dil. Factor:		
	2400 Date of Analysis: 9/27/95	
Analyst's Initials:	LTS	
The Author Carrier Street Control of Street		Sept. 40 (4) (4)

Compound	Det. Limit (ppbv)	Amount (ppby)
Vinyl Chloride	1200	Not Detected
1,1-Dichloroethene	1200	Not Detected
Freon 113	1200	Not Detected
cis-1,2-Dichloroethene	1200	14000
Chloroform	1200	Not Detected
1,1,1-Trichloroethane	1200	Not Detected
Benzene	1200	1900
Trichloroethene	1200	470000 E 3 ₩
Toluene	1200	Not Detected
Tetrachloroethene	1200	Not Detected
m,p-Xylene	1200	5400
o-Xylene	1200	3900
Acetone	4800	Not Detected

E = Exceeds instrument calibration range, but within linear range.

<u>Surrogates</u>	% Recovery Method	Limite
Octafluorotoluene	97 70-1	
Toluene-d8	103	7.7
4-Bromofluorobenz	ne 97 70-1	€ 71 × 21 5

SAMPLE NAME: TEN-017 ID#: 9509271A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	9092726	Date of Collection: 9/27/95
Dil. Factor:	2.1	Date of Analysis: 9/28/95
Analyst's Initials:	LTS	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.1	Not Detected
1,1-Dichloroethene	1.1	Not Detected
Freon 113	1.1	Not Detected
cis-1,2-Dichloroethene	1.1	Not Detected
Chloroform	1.1	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected
Benzene	1.1	Not Detected
Trichloroethene	1.1	Not Detected
Toluene	1.1	Not Detected
Tetrachloroethene	1.1	Not Detected
m,p-Xylene	1.1	Not Detected
o-Xylene	1.1	Not Detected
Acetone	4.2	34

<u>Surrogates</u>	% Recovery Method L	<u>imits</u>
Octafluorotoluene	98 70-13	0
Toluene-d8	70-13	0
4-Bromofluorobenzene	102 70-13	0

SAMPLE NAME: Method Spike ID#: 9509271A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9092718 Date of Collection: NA
Dil. Factor: 1.0 Date of Analysis: 9/27/95
Analyst's Initials: BJM

Compound	Det. Limit (ppbv)	% Recovery /
Vinyl Chloride	0.50	135 Q 🗸
1,1-Dichloroethene	0.50	102
Freon 113	0.50	103
cis-1,2-Dichloroethene	0.50	96
Chloroform	0.50	92
1,1,1-Trichloroethane	0.50	91
Benzene	0.50	105
Trichloroethene	0.50	89
Toluene	0.50	
Tetrachloroethene	0.50	92
m,p-Xylene	0.50	82
o-Xylene	0.50	92
Acetone		88
70010110	2.0	102

Q = Exceeds Quality Control limits of 70% to 130%.

Container Type: NA

Surrogates %	Recovery Method Limits
Octafluorotoluene	97 70-130
Toluene-d8	102 70-130
4-Bromofluorobenzene	102 70-130

SAMPLE NAME: Lab Blank ID#: 9509271A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9092721 Date of Collection: NA
Dil. Factor: 1.0 Date of Analysis: 9/27/95
Analyst's Initials: LTS

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

Surrogates % F	Recovery Method Limits
Octafluorotoluene	95 70-130
Toluene-d8	102 70-130
4-Bromofluorobenzene	99 70-130

9509271

COR PORATION CHAIN OF CUSTODY RECORD

THE INSTRUCTIONS FOR FILLING OUT
THIS FORM ARE ON THE BACK

TASK OR SUB TASK (one per form)

02A

OIA

LABORATORY NAME & ADDRESS;

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95627 (916) 362-5332

10.0 134 212 10-14. Pre Cacker VC S DATE 1/21/2 DATE 6. 10 Profeed L۸ اد المدرون POUNCE CHAIN-OF-CUSTODY RETURNED BY RELINGUISED BY F./ Ve 3 03/ COMMENTS 3/1 Dog 03:0 12.40 17/19/1/26 15:21 0 M.CAFR. 11719 G The Inc Hir Theater Hilly 9 1713 9/12/16 STYLLAG SYMBLE -DATE DATE PATE 7 CHARGE NUMBER: 369-164 しつつ 4. 3 - pe 24/240 CONTRACT NAME: SAMPLE NUMBER 7.01 10-110 717

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROLL YELL OWN LABORATOMY / BLUE - LABORATORY RECEIPT

5852

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509271B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8187

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/27/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED: 10

10/6/95

AMOUNT\$: \$100.00

			RECEIPT	
FRACTION#	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-016	Mod. Method 18	9.5 "Hg	\$50.00
02A	TEN-017	Mod. Method 18	10.5 "Hg	\$50.00
03A	Method Spike	Mod. Method 18	NA	NC
04A	Lab Blank	Mod. Method 18	NA	NC

10/10/95 gun

CERTIFIED BY:

Laboratory Director

DATE: 10/4

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

For Factor Vinyl Chloride 9.8 Vinyl Chloride 2.1 Vinyl Chloride 1.0	9/27/95 9/27/95	Name Date A092816 9/27/95 A092814 9/27/95
	9/27/95	
	9/27/95	
	A A	A092812 NA
Vinyl Chloride 1.0	NA	A092810 NA

Comments: NA = Not Applicable

Analysis Date: 9/28/95 Container Type: 6 Liter Summa Canister Analyst's Initials: JS

RECORD CHAIN OF CUSTODY

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

CORPORATION
10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827
(916) 362-5332

5852

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STATTINI DISPOSALER'S BIAG DISPOSAL BA Surte B ဘ TIME 10-14, Profuel 1 V.C 10-14, Prelader VC 127/05 TYPE OF ANALYSIS DATE LABORATORY NAME & ADDRESS; John 4 classected 6 ج POUINC CK/ RELINQUISED BY amos Blue 130 m PRESERVATIVE CODE 3 7 **XIRTAM** 08/ COMMENTS **UNIT QUANTITY** 1.1,161 19/1/5 004 00:01 56/EN P 13:20 TIME 17 195 120 TIME NUMBER OF UNITS CHARGE NUMBER: 3 69-104-18-0 CONTRACT NAME: OUC I LCAFIB. 9 1775 Trootability DATE DATE 4 X BLAITIN SAMPLERS 0 1015 TASK OR SUB TASK (one per form) TIME 11.15 COLLECTION 34/2411 111) 7/16 1.4.1 361 DATE RELEASED BY 1 he (motilik RECEIVED BY SAMPLE NUMBER 7.0-NII 610 ****

WHILL . COORDINATOR / GOLDENHOD . PHOJECT DIRECTOR / PINK . SAMPLE CONTHOUN YELLOW ! LABORATORY / BLUE . LABORATORY RECEIPT

TIME

DATE

CHAIN-OF-CUSTODY RETURNED BY

13 do

9/10/16

B

TIME

DATE

DISPOSAL CONFIRMED BY

. Ç



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509313A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

FAX: DATE RECEIVED: 916-362-2318

DATE COMPLETED:

10/6/95

9/29/95

INVOICE # 8189

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION #	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-018	TO-14	2.5 "Hg	\$205.00
02A	TEN-019	TO-14	2.5 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

CERTIFIED BY:

Laboratory Director

SAMPLE NAME: TIN-018 ID#: 9509313A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5100210 Date of Collection: 9/29/95
Dil. Factor: 1500 Date of Analysis: 10/2/95
Analyst's Initials: MH

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	750	1800
1,1-Dichloroethene	750	Not Detected
Freon 113	750	Not Detected
cis-1,2-Dichloroethene	750	21000
Chloroform	750	2000
1,1,1-Trichloroethane	750	Not Detected
Benzene	750	2500
Trichloroethene	750	
Toluene	750	570000
Tetrachloroethene	750	1300
m,p-Xylene		Not Detected
	750	7100
o-Xylene	750	6000
Acetone	3000	Not Detected

<u>Surrogates</u>	% Recovery Method L	imite
Octafluorotoluene	104 70-13	and a section of the section
Toluene-d8	98 70-13	$T_{A}(A,A) = 0$
4-Bromofluorobenzene	94 70-13	

SAMPLE NAME: TEN-019 ID#: 9509313A-02A

EPA METHOD TO-14 GC/MS Full Scan

	Date of Collection: 9/29/95
File Name: 5100209	
File Name: 5100209	
Dil. Factor: 5.8	Date of Analysis: 10/2/95
Analyst's Initials:	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	2.9	Not Detected
1,1-Dichloroethene	2.9	Not Detected
Freon 113	2.9	Not Detected
cis-1,2-Dichloroethene	2.9	Not Detected
Chloroform	2.9	Not Detected
1,1,1-Trichloroethane	2.9	Not Detected
Benzene	2.9	Not Detected
Trichloroethene	2.9	Not Detected
Toluene	2.9	Not Detected
Tetrachloroethene	2.9	Not Detected
m,p-Xylene	2.9	Not Detected
o-Xylene	2.9	Not Detected
Acetone	12	. 16

Surrogates %	Recovery Method Limits
Octafluorotoluene	88 70-130
Toluene-d8	98 70-130
4-Bromofluorobenzene	97 70-130

SAMPLE NAME: Method Spike ID#: 9509313A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:		
그 그 교육의 원리 경기 중점 등 위한 2012년 2월 2일 시간 중점	5100202 Date of Collection: NA	
Dil. Factor:	1.0 Date of Analysis: 10/2/95	25
Analyst's Initials:		

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	97
1,1-Dichloroethene	0.50	103
Freon 113	0.50	98
cis-1,2-Dichloroethene	0.50	95
Chloroform	0.50	100
1,1,1-Trichloroethane	0.50	102
Benzene	0.50	92
Trichloroethene	0.50	87
Toluene	0.50	84
Tetrachloroethene	0.50	81
m,p-Xylene	0.50	90
o-Xylene	0.50	85
Acetone	2.0	103

Container Type: NA

Surrogates	% Recovery Method Limi	
Octafluorotoluene	103 70-130	II.D
Toluene-d8	99 70-130	
4-Bromofluorobenzene	109 70-130	

SAMPLE NAME: Lab Blank ID#: 9509313A-04A

EPA METHOD TO-14 GC/MS Full Scan

TO A CONTRACTOR OF THE CONTRACTOR AND	Mark Control
File Name: 5100206 Date of Collection: NA	
File Name: 5100206 Date of Collection: NA	100000
rie Ralie. Jivzw Dae Vi Wiechvii. RA	6786
	1 11 15
	active is
Dil. Factor: 1.0 Date of Analysis: 10/2/95	200000
Dil. Factor: 1.0 Date of Analysis: 10/2/95	4239.733
THE PACTOR THE PROPERTY OF A PARTY SIR! HE PARTY SIR! HE PARTY SIR!	125 (4)
	V 3015
- The Control of the Activities and Activities an	5
	4 4
■ 1 - ■ 2 - 2 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -	5.4
	1000 100
Analyst's Initials: MH	
	4550.4

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachioroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

	TAKE TO SEE THE CAMPAGEMENT OF THE PROPERTY OF	narra na kalingang proposation on the memberah kan berahaman kaling termanan mengalah beraham mengan pertamban
Surrogates	% Recovery	Method Limits
Surrodates	% Hecovery	Merboa i iniis
		The contract of the second sec
		SHEM ONESCHERMON POSITIVE TO THE CONTROL OF THE
	그리아의 그는 이번 사람들은 사람이 얼마나 살을 보고 그는 사람들도 그 그렇게 하셨다면 없다.	ustam material section and decrease with a material control of the
Octafluorotoluene	105	
Octaniuorotoruene .		70-130
	하다는 사람들은 얼마나 아니라 아니라 얼마나 아니는 그 그리고 있다면 하는데 얼마를 살아왔다.	가 먹는 그 바다시작 방안 되었는데 가게 보고 있다. 생각 원생들은 그는 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그
	지나이다. [1] 그 영화는 전문에서 바다 하다. 하는 그는 사람들에서 생각을 살려고 하는데	(大) 사람이 사용하다 하나 아이들은 사람들이 되었다.
Toluene-d8	뭐 이 마음을 하게 하는데 그는 경기를 위해 보고 하수 수 없었다. 하는데 하나 없었다.	3) [[] [] [] [] [] [] [] [] []
101UPDP=08	96	70-130
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	1 1	KAN AND KARAMAN DI JOHN, DI MARKET OF FOOL RED TO
	그들이는 남면이 작용되는 이 등 전혀 하를 하는 것이 하는 이 생각 생각이 하려면 하다 하다.	\$20 Pt
	사람들은 사람들은 이 사람들이 가는 것이 없는 것이 없는 것이 없는 것이 없는 것이 없다. 그는 것이다.	
4-Bromofluorobenzene	a cubinata wata a abiliba a taka a 📅 📆 🕍 Wilayu. 1989 a	70-130
4-Divilionationenzene	- da aztrazioù del Navaza del 1911 (d. 1911) e de la 1911 (d. 1911) e de la 1911 (d. 1911) e de la 1911 (d. 19	
	AND BELLEVIA OF THE SECOND STATES AND	######################################

9509313^K

CHAIN OF CUSTODY RECORD RADIAM.

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

C)A

CZE

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827 (916) 362-5332

4998

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT Custody Seal intact? Y N Noneway Temp. A 10-14 Picket Ux SMRS at terted M 256 LABORATORY NAME & ADDRESS esi C 325 Condition when regolved D Ĺ 11/-11 z CHAIN-OF-CUSTODY RETURNED BY RELINGUISED BY ō COMMENTS 40 13:30 13.30 (J. J.) 1000 2411 29698 DATE TASK OR SUB TASK (one per form): <u>ر</u> **ペ**/ ひ TO DETERMINE STATE OF THE STATE CONTRACT NAME: COUL DISPOSAL CONFIRMED BY CHARGE NUMBER: RECEIVED BY 1. FN-019 71N-016

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9509313B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8189

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

9/29/95

PROJECT # 269-104-18-02 McClellan Thermatrix

RECEIPT

DATE COMPLETED:

10/6/95

AMOUNT\$: \$50.00

PRICE
NC .
\$50.00
NC
NC

LAB NARRATIVE:

*Sample not analyzed per client's request.

CERTIFIED BY: Sinde & France

Laboratory Director

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

			İ				
91	20	1.0	Vinyl Chloride	Y Y	A100201	9509313B-03A	Method Spike
% Recovery							Spiked Sample
	•					ſ	
Not Detected	20	1.0	Vinyl Chloride	۷ ۷	A100202	9509313B-04A	Lab Blank
Not Detected	75	. 5.	Vinyl Chloride	9/29/95	A100204	9509313B-0ZA	810-101
	}		•				
Not Analyzed	50	1.0	Vinyl Chloride	9/29/95	NA	9509313B-01A	TIN-018*
(Agda)	(hddd)	Factor	For	Date	Name	Sample I.D.	Sample I.D.
Amount	Det. Limit	Dilution	Analyzed	Sample	File	Lab	Field

Analysis Date: 10/2/95

Container Type: 6 Liter Summa Canister Analyst's Initials: JS

Comments: NA = Not Applicable **Sample not analyzed per client's request.

KADIAN CORPORATION **CHAIN OF CUSTODY RECORD** USE A BALLPOINT PEN'AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

(916) 362-5332

10395 OLD PLACERVILLE ROAD, SACRAMENTO, CA 95827

FEB il

STATINI DISPOSALER'S **3TAQ** RO, STEB 00 TIME THME 10-14 Picker UC Custody Seal intact? Y N Nong Ma Tenip. SARS TYPE OF ANALYSIS pood DATE 810 - NI LABORATORY NAME & ADDRESS: RAUINE a 11.0 CHAIN-OF-CUSTODY RETURNED BY RELINGUISED BY MATRIX CODE 0 0 COMMENTS: o{:₹/ 16:40 400 TIME TIME TIME OF UNITS NUMBER 10/0 54694 341716 DATE 10. DATE DATE BJAITIN 1. A F SAMPLERS 104-16010 O رد/0/ IASK OR SUB TASK (one per form) TIME COLLECTION À CHARGE NUMBER:) [4 -DISPOSAL CONFIRMED BY CONTRACT NAME: 011/ DATE RELEASED BY RECEIVED BY SAMPLE NUMBER N-614 310-N11

CEN

WHILE CONTINUATION COLDENHOD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW TABORATORY / BLUE - LABORATORY RECEIPT

4998

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510008A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

FAX:

DATE RECEIVED: 10/6/95

DATE COMPLETED:

10/2/95

916-362-2318

SUBCONTRACT # 259699

INVOICE # 8193

PROJECT # 269-104-18-02 McClellan Thermatrix

DECEIDE

AMOUNT\$: \$615.00

			RECEIPI	
FRACTION #	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-20	TO-14	1.5 "Hg	\$205.00
01B	TIN-20 Duplicate	TO-14	1.5 "Hg	\$205.00
02A	TEN-21	TO-14	3.0 "Hg	\$205.00
03A	Method Spike	TO-14	NA _	NC
04A	Lab Blank	TO-14	NA	NC
04B	Lab Blank	TO-14	NA	NC

Laboratory Director

SAMPLE NAME: TIN-20 ID#: 9510008A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5100315	Date of Collection: 10/2/95
Dil. Factor: 2800	Date of Analysis: 10/3/95
Analyst's Initials: MH	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1400	1900
1,1-Dichloroethene	1400	Not Detected
Freon 113	1400	Not Detected
cis-1,2-Dichloroethene	1400	23000
Chloroform	1400	2400
1,1,1-Trichloroethane	1400	Not Detected
Benzene	1400	2400
Trichloroethene	1400	660000 EST
Toluene	1400	1800
Tetrachloroethene	1400	Not Detected
m,p-Xylene	1400	8800
o-Xylene	1400	8200
Acetone	5600	Not Detected

E = Exceeds instrument calibration range, but within linear range.

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	105 70-130
Toluene-d8	96 70-130
4-Bromofluorobenzene	91 70-130

SAMPLE NAME: TIN-20 Duplicate ID#: 9510008A-01B

EPA METHOD TO-14 GC/MS Full Scan

 In control to the control of the contr	 ************************************
File Name: 5100316	Date of Collection: 10/2/95
rie Raile.	Date of Concollers, 10250
Dil. Factor: 2800	Date of Analysis: 10/3/95
Dii. Factor.	
그 집에 가지 않는 것도 가장하고 하는 말이 되었다. 그 생각 생각수 없어 어떻게 어떻게 하는데요? 요한됐다.	
Analyst's initials:	[1]
Alaiysto ilitudo.	

Compound	Det. Limit (ppbv	Amount (ppbv)	RPD
Vinyl Chloride	1400	2400	23
1,1-Dichloroethene	1400	Not Detected	NA
Freon 113	1400	Not Detected	NA
cis-1,2-Dichloroethene	1400	23000	0
Chloroform	1400	2400	0
1,1,1-Trichloroethane	1400	Not Detected	NA
Benzene	1400	2400	0
Trichloroethene	1400	670000 E ノナ	1.5
Toluene	1400	1700	5.7
Tetrachloroethene	1400	Not Detected	NA
m,p-Xylene	1400	8700	1.1
o-Xylene	1400	7200	13
Acetone	5600	Not Detected	NA

E = Exceeds instrument calibration range, but within linear range.

Surrogates %	Recovery Method Limits
Octafluorotoluene	107 70-130
Toluene-d8	97 70-130
4-Bromofluorobenzene	85 70-130

SAMPLE NAME: TEN-21 ID#: 9510008A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5100325 	Date of Collection	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Analyst's Initials:	3.0 EV	Date of Analysis:	10/4/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.5	Not Detected
1,1-Dichloroethene	1.5	Not Detected
Freon 113	1.5	Not Detected
cis-1,2-Dichloroethene	1.5	Not Detected
Chloroform	1.5	Not Detected
1,1,1-Trichloroethane	1.5	Not Detected
Benzene	1.5	1.8
Trichloroethene	1.5	Not Detected
Toluene	1.5	3.2
Tetrachloroethene	1.5	Not Detected
m,p-Xylene	1.5	Not Detected
o-Xylene	1.5	Not Detected
Acetone	6.0	Not Detected

Surrogates % Recovery	Method Limits
Octafluorotoluene 100	and the second of the second of
- 	70-130
	70-130
4-bromotiuoropenzene 109	70-130

SAMPLE NAME: Method Spike ID#: 9510008A-03A

EPA METHOD TO-14 GC/MS Full Scan

200 CONTROL OF THE PROPERTY OF	School of the second
File Name: 5100302 Date of Collection: NA	
File Name: 5100302 Date of Collection: NA	1988/09/30/2010
Life Marrie.	2000 PM (2000 PM)
Dil. Factor: 1.0 Date of Analysis: 10/3/95	4980×800000 A
Dil. Factor: 1.0 Date of Analysis: 10/3/95	
	화학 가능하는 함께
	, M. J. E. & MA, A.
Analyst's Initials: MH	Arrivation and the
Anaivst s initials:	SADMIRAL ARTON

Compound	Det. Limit (ppbv)	% Recovery	
Vinyl Chloride 0.50		84	
1,1-Dichloroethene	0.50	95	
Freon 113	0.50	92	
cis-1,2-Dichloroethene	0.50	97	
Chloroform	0.50	95	
1,1,1-Trichloroethane	0.50	99	
Benzene	0.50	89	
Trichloroethene	0.50	82	
Toluene	0.50	90	
Tetrachloroethene	0.50	82	
m,p-Xylene	0.50	93	
o-Xylene	0.50	89	
Acetone	2.0	103	

Container Type: NA

그는 하고는 그는 것들은 유명없이 살았다. 그 하고는 그 수 있는 집에 없다고 하지만 그렇지만 하고 못했다. 하는	and a residence of the first of the first of the first field of the field of the first field of the field			43
Surrogates	• • • • • • • • • • • • • • • • • • •	Recovery	Method Limits	÷,
<u>Sullogates</u>		ICCO ICI J	Incrited Buttine	
그 일반하는 그 그는 그들은 사람들은 사람이 가지를 받는다.	그는 집안하다면 그 이 집은 하였습니다.			. 15
Octafiuorotoluene	 Provincia i Conserva description 	99	70-130	
Octaniuototolucite	그 그 사용에 나는 사는 얼굴하게 되었다.			. "
and the second of the second o	一、利力・大力・ガー、→の場で勢力等を発			٠.
Toluene-d8	그 문항 가게 있는 것도 보고 있다고 있다.	99	70-130	
i Oluciic-uo				
그는 것 같아		had Brita in waktiinainalii	[MPROS.com. 12] 440 Feb. 200 40 14 <u>1</u> 2 72 1 2 1 1 5 1 5 1 5 1	
4-Bromofluorobenzene	The Property of the Committee of the	95	70-13 0	€.
4-DIOIIIOHUOIODEHZEHE				j),

SAMPLE NAME: Lab Blank ID#: 9510008A-04A

EPA METHOD TO-14 GC/MS Full Scan

The state of the s	
	A CONTRACTOR OF A PROPERTY AND
File Name: 5100305 Date of Collection: N/	
Date of Collection, 14)	🐧
그 그들은 그들은 사실 경험을 하고 있다면 하는 것 같아요. 그는 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은	
Dil. Factor: 1.0 Date of Analysis: 10/3	
COCC. Date of Analysis: 10/3	MAD
Analyst's Initials: MH	
Analyst's Initials:	

Compound	Det. Limit (ppbv)	Amount (ppby)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Surrogates	% Recovery Method Limits
Octafluorotoluene	70-130
Toluene-d8	93 70-130
4-Bromofluorobenzene	70-130

SAMPLE NAME: Lab Blank ID#: 9510008A-04B

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5100321	Date of Collection: NA
Dil. Factor: 1.0	Date of Analysis: 10/3/95
	Date Of Allalysis: 10035
Analyst's Initials: EV	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Surrogates	6 Recovery Method Limits
Octafluorotoluene	106 70-130
Toluene-d8	96 70-130
4-Bromofluorobenzene	86 70-130

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

TASK OR SUB TASK (one per form)

11

RADIAN CORPORATION

10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332

LABORATORY NAME & ADDRESS

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BLUF

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CHARGE NUMBER: CONTRACT NAME: 6 25 0

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PRESERVATIVE

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SAMPLER'S INITIALS

COLLECTION

SAMPLE NUMBER

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SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510008B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8264

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/2/95

PROJECT # 269-104-18-02 McClellan Thermatrix

RECEIPT

DATE COMPLETED:

10/13/95

AMOUNT\$: \$50.00

FRACTION# 01A 02A

NAME TIN-20* **TEN-21** Method Spike

TEST Mod. Method 18 Mod. Method 18 Mod. Method 18 VAC./PRES. 1.5 "Hg 3.0 "Hg NA

NC \$50.00 NC

PRICE

03A 04A

Lab Blank

Mod. Method 18

NC NA

LAB NARRATIVE:

*Sample not analyzed per client's request.

Laboratory Director

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

nit Amount		S	Not Detected	Not Detected	% Recovery	94
Det. Limit	(Agaa)	20	100	20		50
Dilution	Factor	1.0	5.0	1.0		1.0
Analyzed	P	Vinyl Chloride	Vinyl Chloride	Vinyl Chloride		Vinyl Chloride
Sample	Date	10/2/95	10/2/95	N A		NA
File	Name	AN	A100403	A100402		A100401
Lab	Sample I.D.	9510008B-01A	9510008B-02A	9510008B-04A		9510008B-03A
Field	Sample I.D.	TIN-20*	TEN-21	Lab Blank	Spiked Sample	Method Spike

Analysis Date: 10/4/95 Container Type: 6 Liter Summa Canister

Analyst's Initials: JS

*Sample not analyzed per client's request. Comments: NA = Not Applicable

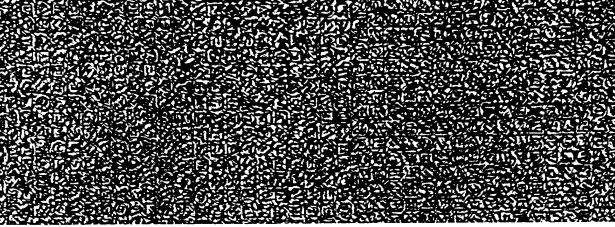
CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

CORPORATION
10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827
(916) 362-5332

STATTINI 'n 1/2/5/ DISPOSALER'S 154 JASOGSRI ZTAQ P. D. C. 11 65 TIME 10-14, Pictori We 18/2/01 DATE TYPE OF ANALYSIS DATE 10-14, PIECEN LABORATORY NAME & ADDRESS: RAVINE シンメンし CHAIN-OF-CUSTODY RETURNED BY anny BLUF RELINGUISED BY ţ PRESERVATIVE CODE XIRTAM 10 COMMENTS UNIT QUANTITY 0116 ہے ان 133 7:55 9.1.91 TIME TIME OF UNITS 12 BK 10/0/10/ 3.111 CONTRACT NAME: OUC / Incales) N DATE • SAF DATE BLAITINI SHALERS 101 ۲ 0130 0860 TASK OR SUB TASK (one per form) TIME COLLECTION CHARGE NUMBER: 7792 DISPOSAL CONFIRMED BY HERMALLIX 2772 OC シャンシン 16/2/0 DATE RELEASED BY RECEIVED BY SAMPLE NUMBER DZKNITN

WHITE FORMINITATION FOR DEPUTION PROFEST DIGITATION PINK - SAMPLE CONTION / YELLOW -LABORATORY / BLUE - LABORATORY RECEIPT





AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510036A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

FAX:

916-362-2318

DATE RECEIVED:

DATE COMPLETED:

10/4/95 10/13/95

SUBCONTRACT # 259699

INVOICE # 8265

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION#	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-022	TO-14	0 "Hg	\$205.00
02A	TEN-023	TO-14	0 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC
04B	Lab Blank	TO-14	NA	NC

CERTIFIED BY

Laboratory Director

SAMPLE NAME: TIN-022 ID#: 9510036A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 9100434	Date of Collection: 10/4/95
Dil. Factor: 3800	Date of Analysis: 10/5/95
Analyst's Initials: BJM	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1900	Not Detected
1,1-Dichloroethene	1900	Not Detected
Freon 113	1900	Not Detected
cis-1,2-Dichloroethene	1900	19000
Chloroform	1900	Not Detected
1,1,1-Trichloroethane	1900	Not Detected
Benzene	1900	3400
Trichloroethene	1900	590000
Toluene	1900	Not Detected
Tetrachloroethene	1900	Not Detected
m,p-Xylene	1900	6800
o-Xylene	1900	4900
Acetone	7600	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery Method Limits
Octafluorotoluene	97 70-130
Toluene-d8	104 70-130
4-Bromofluorobenzene	95 70-130

SAMPLE NAME: TEN-023 ID#: 9510036A-02A

EPA METHOD TO-14 GC/MS Full Scan

and the second s	,我们就是一个大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大大	23.3
THE A A SHARE SHAR	Panaran Pala at Calladian Anidor	5 mil 2
File Name:	5100512 Date of Collection: 10/4/95	2037
incitatio.		5 3 5 5 5 4
	3.0 Date of Analysis: 10/5/95	SME.
Dil. Factor:	3.u Date of Allaivsis, Tubyjo	
Ditt. I HOTOL.	그는 경기에 가장 그는 일반 등에 가장 이 그들은 것이 되었다. 그 경기 가장 하셨다면서 하게 되었다고 있는 중요를 했다고 있는 것이 그 것이 없는 것이 그 것이 없었다. 그 것이 없었다. 그 것이	
		344
A		
Analyst's Initials:		1.75
ministra di li		1202

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.5	Not Detected
1,1-Dichloroethene	1.5	Not Detected
Freon 113	1.5	Not Detected
cis-1.2-Dichloroethene	1.5	Not Detected
Chloroform	1.5	Not Detected
1,1,1-Trichloroethane	1.5	Not Detected
Benzene	1.5	Not Detected
Trichloroethene	1.5	2.8
Toluene	1.5	Not Detected
Tetrachloroethene	1.5	Not Detected
m,p-Xylene	1.5	Not Detected
o-Xylene	1.5	Not Detected
Acetone	6.0	6.4

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery Method Limit	5
Octafluorotoluene	95 70-130	ria.
Toluene-d8	102 70-130	
4-Bromofluorobenz	ne 100 70-130	

SAMPLE NAME: Method Spike ID#: 9510036A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	
	0421 Date of Collection: NA
	0421 Date of Collection: NA
Dil. Factor:	10 Date of Analysis, 10/4/05
	1.0 Date of Analysis: 10/4/95
Analyst's Initials:	

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	125
1,1-Dichloroethene	0.50	100
Freon 113	0.50	96
cis-1,2-Dichloroethene	0.50	93
Chloroform	0.50	94
1,1,1-Trichloroethane	0.50	92
Benzene	0.50	103
Trichloroethene	0.50	87
Toluene	0.50	93
Tetrachloroethene	0.50	82
m,p-Xylene	0.50	94
o-Xylene	0.50	96
Acetone	2.0	108

Surrogates	% Recovery Method Limits
Octafluorotoluene	99 70-130
Toluene-d8	104 70-130
4-Bromofluorobenzene	102 70-130

SAMPLE NAME: Lab Blank ID#: 9510036A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	9100423	Date of Collection: NA	
DII. Factor:	1.0	Date of Analysis: 10/5/9	
Analyst's Initials:	EV		

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

<u>Surrogates</u>	% Recovery Method Lir	nits
Octafluorotoluene	97 70-130	Taleba Se
Toluene-d8	101 70-130	
4-Bromofluorobenzene	98 70-130	7

SAMPLE NAME: Lab Blank ID#: 9510036A-04B

EPA METHOD TO-14 GC/MS Full Scan

Control who specified an analysis of the specified and the s	
File Name: 5100504 Date of Collection, NA	Diskur of the
File Name: 5100504 Date of Collection: NA	44.04 h.g.
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Dil. Factor: 1.0 Date of Analysis: 10/5/95	STATE OF THE STATE
	1000 F 400
Analyst's Initials:	, 145.0° .
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Compound	Det. Limit (ppbv)	Amount (ppby)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected Not Detected
Acetone	2.0	Not Detected

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	108 70-130
Toluene-d8	
4-Bromofluorobenzene	98 70-130 83 70-130

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

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CORPORATION 9510036 10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332

LABORATORY NAME & ADDRESS:

É DVIE DISBOSYF 20 11 His TYPE OF ANALYSIS 7 2 PRESERYATIVE MATERIX GODE 2 COMMENTS): :: NUMBER OF UNITS Sampler's Inttials DATE DATE 1 12 TASK OR SUB TASK (one per form) **JAKE** SOLLECTION DATE ,,,, RELEASED BY RECEIVED BY CHARGE NUMBER: CONTRACT NAME: SAMPLENUMBER

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WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

CHAIN-OF-CUSTOOY RETURNED BY

DATE

DISPOSAL CONFIRMED BY

176/h/

Charl Y'SOWY

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510036B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8265

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/4/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED: 10/13/95

AMOUNT\$: \$150.00

			RECEIPT	
FRACTION #	<u>NAME</u>	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-022	Mod. Method 18	0 "Hg	\$50.00
01B	TIN-022 Duplicate	Mod. Method 18	0 "Hg	\$50.00
02A	TEN-023	Mod. Method 18	0 "Hg	\$50.00
03A	Method Spike	Mod. Method 18	NA	NC
04A	Lab Blank	Mod. Method 18	NA	NC
04B	Lab Blank	Mod. Method 18	NA	NC

10/18/95 No gund

CERTIFIED BY

Laboratory Director

DATE: 10 /13/93

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Factor				
		For	Date For	name Date For
1.3	Vinyl Chloride 1.3		Vinyl Chloride	10/4/95 Vinyl Chloride
1.3	Vinyl Chloride 1.3	10/4/95 Vinyl Chloride 1.3		10/4/95
1.3	Vinyl Chloride 1.3	10/4/95 Vinyl Chloride 1.3		10/4/95
1.0	Vinyl Chloride 1.0	_	Vinyl Chloride	NA Vinyl Chloride 1
1.0	Vinyl Chloride 1.0	_	Vinyl Chloride	NA Vinyl Chloride
	Vinyl Chloride Vinyl Chloride Vinyl Chloride Vinyl Chloride		10/4/95 10/4/95 NA	A100904 10/4/95 A100505 10/4/95 A100902 NA

Analysis Date: 10/5/95 & 10/9/95

Container Type: 6 Liter Summa Canister Analyst's Initials: JS

Comments: NA = Not Applicable

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PHESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

TASK OR SUB TASK (one per form)

CONTRACT NAME:

CHARGE NUMBER:

CORDORADIO DE LA CORDO DEL CORDO DE LA CORDO DE LA CORDO DEL CORDO DE LA CORDO DEL CORDO DEL CORDO DEL CORDO DE LA CORDO DEL C

LABORATORY NAME & ADDRESS:

9510036

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RELEASED BY	DATE	TIME	COMMENTS:
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	, ,	4	
	11		
DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY DATE TIME
	/ /		

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

20

TYPE OF ANALYSIS

PRESERVATIVE

MATRIX GODE

NUMBER OF UNITS

SAMPLER'S

COLLECTION

UNIT QUANTITY

TME

DATE

SAMPLE NUMBER

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510085A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

916-362-2318 FAX:

DATE RECEIVED: 10/9/95 DATE COMPLETED 10/13/95 **INVOICE # 8266**

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION#	NAME	<u>TEST</u>	VAC./PRES.	<u>PRICE</u>
01A	TIN-024	TO-14	2.5 "Hg	\$205.00
02A	TEN-025	TO-14	2.5 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

Laboratory Director

SAMPLE NAME: TIN-024 ID#: 9510085A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5101025		ection: 10/6/95
Dil. Factor:	3600	Date of Analy	ysis: 10/11/95
Analyst's initials:	MH		

Compound	Det. Limit (ppbv)	Amount (ppby)
Vinyl Chloride	1800	Not Detected
1,1-Dichloroethene	1800	Not Detected
Freon 113	1800	Not Detected
cis-1,2-Dichloroethene	1800	20000
Chloroform	1800	Not Detected
1,1,1-Trichloroethane	1800	Not Detected
Benzene	1800	2500
Trichloroethene	1800	560000
Toluene	1800	Not Detected
Tetrachloroethene	1800	
m,p-Xylene	1800	Not Detected
o-Xylene	1800	7500
Acetone	7200	6800 Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	% F	Recovery	Method Limits
Octafluorotoluene		102	70-130
Toluene-d8		102	70-130 70-130
4-Bromofluorobenzene		77	70-130 70-130

SAMPLE NAME: TEN-025 ID#: 9510085A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5101024	Date of Collection: 10/6/95
Dil. Factor: 4.7	Date of Analysis: 10/11/95
Analyst's Initials: MH	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	2.4	Not Detected
1,1-Dichloroethene	2.4	Not Detected
Freon 113	2.4	Not Detected
cis-1,2-Dichloroethene	2.4	Not Detected
Chloroform	2.4	Not Detected
1,1,1-Trichloroethane	2.4	Not Detected
Benzene	2.4	Not Detected
Trichloroethene	2.4	4.1
Toluene	2.4	Not Detected
Tetrachloroethene	2.4	Not Detected
m,p-Xylene	2.4	4.1
o-Xylene	2.4	3.6
Acetone	9.4	10

Container Type: 6 Liter Summa Canister

Surrogates %	Recovery Method Limits
Octafluorotoluene	94 70-130
Toluene-d8	107 70-130
4-Bromofluorobenzene	106 70-130

SAMPLE NAME: Method Spike ID#: 9510085A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5101018 Date of Collection: NA	1 1971 - 1771 -
Dil. Factor:	1.0 Date of Analysis: 10/10/95	
Analyst's Initials:	BJM	

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	102
1,1-Dichloroethene	0.50	107
Freon 113	0.50	95
cis-1,2-Dichloroethene	0.50	103
Chloroform	0.50	103
1,1,1-Trichloroethane	0.50	100
Benzene	0.50	106
Trichloroethene	0.50	94
Toluene	0.50	100
Tetrachloroethene	0.50	95
m,p-Xylene	0.50	101
o-Xylene	0.50	108
Acetone	2.0	78

Surrogates	% Recovery Method L	imita
Octafluorotoluene	98 70-13	
Toluene-d8	102 70-13	Tagin, mark
4-Bromofluoroben		Turkey 1

SAMPLE NAME: Lab Blank ID#: 9510085A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	5101021	The Control of the Co	ollection: NA
Dil. Factor:	1.0		nalysis: 10/10/95
Analyst's Initials:	MH		

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachioroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

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Surrogates % Recovery Metho	d Limits
Surrogates % Metro	a Limits
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Octafluorotoluene 101	-130
Octahuolotoidene 101	~130
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Toluene-d8 95	-130
TOTAL COLOR OF THE	-100
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4-Bromofluorobenzene 72 70	-130
4-Didinoliuorooenzene	-1.31)

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CHAIN OF CUSTODY RECORD

CORPORATION
10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827
(916) 362-5332

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

251 MITALS MITALS 25 DASPOSAL DATE 30 300 ω ম Helod. TYPE OF ANALYSIS est of the DATE 10-14 Picher DATE 6101 LABORATORY NAME & ADDRESS: KOVINE 11.11 CHAIN-OF-CUSTODY RETURNED BY ダンメロー Cin 2 (12 1 20 RELINGUISED BY PRESERVATIVE 186 6100 NATRIX SODE 2 2 11 COMMENTS: UNITOUANTIT ني AFB Thermotist Theorability 400 ~ ¥ JINE. 0 OE DMUS NONBEE ١ KICAFB 1010 armpler3 DATE DATE DATE ŧ 1. 1.1 72 TASK OR SUB TASK (one per form) CHARGE NUMBER: 3 139 116 SOLECTION. グニナ CONTRACT NAME: COL 7/1/ DISPOSAL CONFIRMED BY DATE RELEASED BY RECEIVED BY SAMPLE NUMBER アノノーハノイ 3 ¢ , , ,

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

10/27/95

Ms. Courtney Morris Radian Corporation 10389 Old Placerville Road Sacramento, CA 95827

Dear Courtney:

The enclosed diskette is being provided by Air Toxics Ltd. The laboratory report numbers included on the diskette are:

9510085B

The samples included are:	Client Sample ID	Lab Sample ID
The samples melada and	TIN-024	9510085B-01A
	TEN-025	9510085B-02A
	Method Spike	9510085B-03A
	Lab Blank	9510085B-04A

This diskette was created in MS Excel 5.0 and saved in a comma delimited format.

If you have any questions regarding this diskette, please feel free to contact me at 1-800-985-5955.

Sincerely,

C. Craig Crume

Vice President Marketing

Air Toxics Ltd.

10/20/93
No que

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510085B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8458

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/9/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

10/27/95

AMOUNT\$: \$100.00

RECEIPT **FRACTION# NAME TEST** VAC./PRES. PRICE 01A TIN-024 Mod. Method 18 2.5 "Hg \$50.00 02A TEN-025 Mod. Method 18 2.5 "Hg \$50.00 03A Method Spike Mod. Method 18 NA NC 04A Lab Blank Mod. Method 18 NA NC

CERTIFIED BY: Senda & Trumer

Laboratory Director

DATE: 10/07/98

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(vddd)	(ppbv)
TIN-024	9510085B-01A	A101103	10/6/95	Vinyl Chloride	1.5	75	2300
TEN-025	9510085B-02A	A101104	10/6/95	Vinyl Chloride	1.5	75	620
Lab Blank	9510085B-04A	A101102	NA	Vinyl Chloride	1.0	50	Not Detected
Spiked Sample							% Recovery
Method Spike	9510085B-03A	A101101	ΑN	Vinyl Chloride	1.0	20	80

Comments: NA = Not Applicable

Analysis Date: 10/11/95 Container Type: 6 Liter Summa Canister Analyst's Initials: SPM

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

CORPORATION SACHAMENTO, CA 95827 (916) 362-5332

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			1c B			٧.۲	ų C.	-						TIME	115.4	7/30	5/30		<u>}·</u>	TIME	
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USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK	TASK OR SUB TASK (one per form):	11,	CONTRACT NAME:	CHARGE NUMBER:) (9 - 10 1/	SAMPLE NUMBER	11 174	519-N11					REU	1	REC	J.L	17				DISPOSAL CONFIRMED BY	
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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510099A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

PHONE:

916-362-5332

FAX:

916-362-2318

DATE RECEIVED:

10/10/95

DATE COMPLETED: 10/20/95

INVOICE # 8358

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

TEST VAC./PRES. **PRICE FRACTION# NAME** \$205.00 TIN-026 TO-14 4.0 "Hg 01A \$205.00 02A TEN-027 TO-14 1.0 "Hg 03A Method Spike TO-14 NA NC NC TO-14 NA 04A Lab Blank

CERTIFIED BY

Laboratory/Director

SAMPLE NAME: TIN-026 ID#: 9510099A-01A

EPA METHOD TO-14 GC/MS Full Scan

Dil. Factor: Analyst's Initials:

Date of Collection: 10/10/95 Date of Analysis: 10/11/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1100	Not Detected
1,1-Dichloroethene	1100	Not Detected
Freon 113	1100	Not Detected
cis-1,2-Dichloroethene	1100	18000
Chloroform	1100	1600
1,1,1-Trichloroethane	1100	Not Detected
Benzene	1100	2200
Trichloroethene	1100	480000
Toluene	1100	Not Detected
Tetrachloroethene	1100	Not Detected
m,p-Xylene	1100	6100
o-Xylene	1100	4800
Acetone	4200	Not Detected

Container Type: 6 Liter Summa Canister

<u>Surrogates</u>	**		% Re	coverv	21-15	Method Limits
Octafluorotoluene		, t	1	01		70-130
Toluene-d8			9) 8	***	70-130
4-Bromofluorobenzene		144	8	12	1 - 1 2 2 -	70-130

SAMPLE NAME: TEN-027 · ID#: 9510099A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: Dil. Factor:		5101106 2.8	그 그 그리 본 다양하세 생생의 가방 요니 요요요.	of Collection: 10 of Analysis: 10/1	
Analyst's Initials:	3 25 2 54	EV			

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1.4	Not Detected
1,1-Dichloroethene	1.4	Not Detected
Freon 113	1.4	Not Detected
cis-1,2-Dichloroethene	1.4	Not Detected
Chloroform	1.4	Not Detected
1,1,1-Trichloroethane	1.4	Not Detected
Benzene	1.4	2.0
Trichloroethene	1.4	1.7
Toluene	1.4	4.5
Tetrachloroethene	1.4	Not Detected
m,p-Xylene	1.4	2.6
o-Xylene	1.4	Not Detected
Acetone	5.6	9.6

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	92	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	105	70-130

SAMPLE NAME: Method Spike ID#: 9510099A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	Taylor S.	5101102	Da	ite of Colle	ection: NA
Dil. Factor:		1.0			ysis: 10/11/95
Analyst's Initials:	1111	EV			

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	92
1,1-Dichloroethene	0.50	101
Freon 113	0.50	88
cis-1,2-Dichloroethene	0.50	101
Chloroform	0.50	96
1,1,1-Trichloroethane	0.50	92
Benzene	0.50	95
Trichloroethene	0.50	82
Toluene	0.50	91
Tetrachloroethene	0.50	85
m,p-Xylene	0.50	87
o-Xylene	0.50	86
Acetone	2.0	76

<u>Surrogates</u>		% Recovery	Method Limits
Octafluorotoluene		99	70-130
Toluene-d8		101	70-130
4-Bromofluorobenzene	.20	104	70-130

SAMPLE NAME: Lab Blank ID#: 9510099A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 5101104

Dil. Factor: 1.0

Analyst's Initials: MPG

Date of Collection: NA
Date of Analysis: 10/11/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Surrogates			% Recovery	Method Limits
Octafluorotoluene		raidi. Jir.	92	70-130
Toluene-d8			105	70-130
4-Bromofluorobena	zene		105	70-130

9510099 A

CORPORATION

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

S

10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332

STATUME SERVICES ALVO TVROUSEO **₹** 10/10/95#11 :55 . こ 7 5/1/1/0 The 14 Pictor *⊃* \$ 0 DATE BLVO LABORATORY NAME & ADDRESS: 0 3 1 V 200 -N1 [11-0 ころ CHAIN-OF-CUSTODY RETURNED BY Œ 1010 RELINGUISED BY PRESERVATIVE MATRIX 3000 2 COMMENTS: CATACAMETER TIME 10/15/10:55 5.8 ``` S: 11/2/11/01 of Units 5/10/95 ∞ 16/2/10 erajanae Biaithu DATE DATE DATE 4-111 TASK OR SUB TASK (one per form)) COLLECTION 7. 5. 1111 (3 (4) DISPOSAL CONFIRMED BY DATE 21011-11 CONTRACT NAME: / RELEASED BY THING FULL CHARGE NUMBER: RECEIVED BY SANPLE NUMBER ンとこと ٠ 7

WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

1122

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510099B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8358

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/10/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

10/20/95

AMOUNT\$: \$100.00

			RECEIPT	
FRACTION#	<u>NAME</u>	TEST	VAC./PRES.	PRICE
01A	TIN-026	Mod. Method 18	4.0 "Hg	\$50.00
02A	TEN-027	Mod. Method 18	1.0 "Hg	\$50.00
03A	Method Spike	Mod. Method 18	NA	NC
04.4	I ah Riank	Mod Method 18	NA	NC

CERTIFIED BY: Laboratory Director

DATE: 10/20/45

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(vdqq)	(Agaa)
TIN-026	9510099B-01A	A101105	10/10/95	Vinyl Chloride	1.6	80	2600
TEN-027	9510099B-02A	A101106	10/10/95	Vinyl Chloride	1.4	20	Not Detected
Lab Blank	9510099B-04A	A101102	AN	Vinyl Chloride	1.0	90	Not Detected
Spiked Sample							% Recovery
Method Spike	9510099B-03A	A101101	NA	Vinyl Chloride	1.0	50	80

Analysis Date: 10/11/95

Comments: NA = Not Applicable

Container Type: 6 Liter Summa Canister Analyst's Initials: SPM

1122

CORPORATION
10389 ROCKINCHAM ROAD, SACRAMENTO, CA 95827
(916) 362-5332

<u>CHAIN OF CUSTODY RECORD</u>

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

STATTINI DISPOSALER'S DATE DISPOSAL 11:55 သ 1011CTS 11 X . . 10-14, Pla fartion VC 56/01/01 TYPE OF ANALYSIS 0-14, Pickette. ر ا ا LABORATORY NAME & ADDRESS: it de lacied 10-01 37770 ころ 0100 RELINGUISED BY ر ر ک PRESERVATIVE ١ 4015 CODE 2 3 ر دن سد XIRTAM COMMENTS UNIT QUANTITY 10/461 blitel 7 10:50 6/10/95 10:65 400 TIME TIME : иомвев ОF имп'я <u>ئر</u> ن 1171811111111 0115115 CONTRACT NAME: $C \cup C + | b \cdot c \wedge f | \mathcal{B}_{\epsilon}$ DATE DATE BJATTINI 7 ۲ SAMPLERS 05% TASK OR SUB TASK (one per form): × 50 CHARGE NUMBER:) (...) (...) TIME COLLECTION 15/11/21 10/10/16 (m) (E ca) DATE RELEASED BY XIDINALDIN. RECEIVED BY (A & C. SAMPLE NUMBER 101 i - [4]

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WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR, PINK - SAMPLE CONTHOL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

TIME

DATE

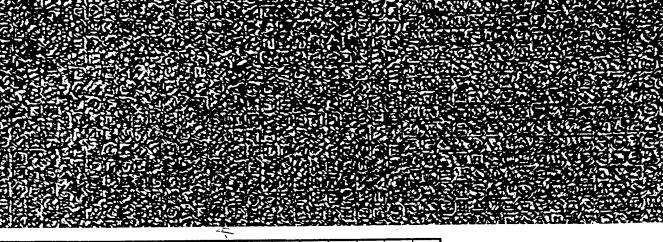
CHAIN-OF-CUSTODY RETURNED BY

TIME

DATE

DISPOSAL CONFIRMED BY

10/10/5/1 :S



AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510133A

Work Order Summary

CLIENT:

Ms. Courtney Morris

Radian Corporation

10389 Old Placerville Road

Sacramento, CA 95827

PHONE:

916-362-5332

FAX:

916-362-2318

DATE RECEIVED: 10/12/95

DATE COMPLETED: 10/20/95

BILL TO: Subcontracts Payable

Radian Corporation

P.O. Box 201088

Austin, TX 78720-1088

INVOICE # 8359

SUBCONTRACT # 259699

PROJECT # 269-104-18-02 McClellan Thermatrix

AMOUNT\$: \$410.00

RECEIPT

FRACTION#	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-028	TO-14	2.0 "Hg	\$205.00
02A	TEN-029	TO-14	3.0 "Hg	\$205.00
03A	Method Spike	TO-14	NA	NC
04A	Lab Blank	TO-14	NA	NC

10/26/95

CERTIFIED BY:

Laboratory Director

SAMPLE NAME: TIN-028 ID#: 9510133A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101309
Dil. Factor: 2400
Analyst's Initials: EV

Date of Collection: 10/11/95 Date of Analysis: 10/13/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1200	Not Detected
1,1-Dichloroethene	1200	Not Detected
Freon 113	1200	Not Detected
cis-1,2-Dichloroethene	1200	17000
Chloroform	1200	1600
1,1,1-Trichloroethane	1200	Not Detected
Benzene	1200	2000
Trichloroethene	1200	500000 E 3
Toluene	1200	Not Detected
Tetrachloroethene	1200	Not Detected
m,p-Xylene	1200	6700
o-Xylene	1200	
Acetone	4800	5800 Not Detected

E = Exceeds instrument calibration range, but within linear range.

<u>Surrogates</u>			% Recovery Method Limits
Octafluorotoluene			70-130
Toluene-d8			115 70-130
4-Bromofluorobenzen	е	W	112 70-130

SAMPLE NAME: TEN-029 ID#: 9510133A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101310
Dil. Factor: 1.8
Analyst's Initials: EV

Date of Collection: 10/11/95
Date of Analysis: 10/13/95

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.90	Not Detected
1,1-Dichloroethene	0.90	Not Detected
Freon 113	0.90	Not Detected
cis-1.2-Dichloroethene	0.90	Not Detected
Chloroform	0.90	Not Detected
1,1,1-Trichloroethane	0.90	Not Detected
Benzene	0.90	Not Detected
Trichloroethene	0.90	Not Detected
Toluene	0.90	Not Detected
Tetrachloroethene	0.90	Not Detected
m,p-Xylene	0.90	Not Detected
o-Xylene	0.90	Not Detected
Acetone	3.6	7.9

<u>Surrogates</u>	 <u>%</u>]	Recovery	Me	thod Limits
Octafluorotoluene	gir.	92	1, 33	70-130
Toluene-d8		109		70-130
4-Bromofluorobenzene	1 de 1	118		70-130

SAMPLE NAME: Method Spike ID#: 9510133A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:
Dil. Factor:
Analyst's Initials:

1101305 Date of Collection: NA 1.0 Date of Analysis: 10/13/95

LTS

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	103
1,1-Dichloroethene	0.50	95
Freon 113	0.50	107
cis-1,2-Dichloroethene	0.50	96
Chloroform	0.50	105
1,1,1-Trichloroethane	0.50	110
Benzene	0.50	106
Trichloroethene	0.50	96
Toluene	0.50	100
Tetrachloroethene	0.50	103
m,p-Xylene	0.50	92
o-Xylene	0.50	96
Acetone	2.0	76

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	113	70-130
Toluene-d8	114	70-130
4-Bromofluorobenzene	113	70-130

SAMPLE NAME: Lab Blank ID#: 9510133A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101308 Date of Collection: NA
Dil. Factor: 1.0 Date of Analysis: 10/13/95
Analyst's Initials: LTS

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

Surrogates		% Recovery Method L	<u>imits</u>
Octafluorotoluene		70-130	0
Toluene-d8		70-130	0
4-Bromofluorobenz	ene	70-130	0

1138

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

TASK OR SUB TASK (one per form)

CORPORIGHAM ROAD, SACRAMENTO, CA 95827 19389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332

ABORATORY NAME & ADDRESS:

70

CONTRACT NAME: ()

CHARGE NUMBER:

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WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510133B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8359

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/12/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED:

10/20/95

AMOUNT\$: \$100.00

			RECEIPT	
FRACTION#	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-028	Mod. Method 18	2.0 "Hg	\$50.00
02A	TEN-029	Mod. Method 18	3.0 "Hg	\$50.00
03·A	Method Spike	Mod. Method 18	NA	NC
04 Δ	I ah Rlank	Mod. Method 18	NA	NC

10/26/95 Jul

CERTIFIED BY

Laboratory Director

DATE:

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Det. Limit	Amount
Sample I.D.	Sample I.D.	Name	Date	For	Factor	(hddd)	(vdqd)
TIN-028	9510133B-01A	A101304	10/11/95	Vinyl Chloride	1.4	70	2500
TEN-029	9510133B-02A	A101303	10/11/95	Vinyl Chloride	1.5	75	Not Detected
Lab Blank	9510133B-04A	A101302	Ą Z	Vinyl Chloride	1.0	20	Not Detected
Spiked Sample						L	% Recovery
Method Spike	9510133B-03A	A101301	NA	Vinyl Chloride	1.0	20	86

Analysis Date: 10/13/95 Container Type: 6 Liter Summa Canister Analyst's Initials: JS

Comments: NA = Not Applicable

CORPORATION

(916) 362-5332

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

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10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827

STATTINE 2 RELAZORSIO DATE DISPOSAL ဘ 12:15 TIME TIME ρĊ 00/10/10 d Pictortun ড TYPE OF ANALYSIS DATE DATE ١ LABORATORY NAME & ADDRESS. Ü ≥ ~ C * 10-10 CHAIN-OF-CUSTODY RETURNED BY SUIXUL 11 2000,0211 RELINGUISED BY PRESERVATIVE CODE ž 111 XIRTAM COMMENTS **UNIT QUANTITY** E 1111 (V:2/) [3:20 1:0 TIME TIME TIME 20 от импя 1 1:17:55 34/21/0 19 1.2 Far 36/C/10/ 415 Trenta 11/114 BJAITINI 11 DATE DATE DATE SAMPLERS 7 1630 421-69 1 TASK OR SUB TASK (one per form) TIME COLLECTION 2 1010 CONTRACT NAME: CUC 11/11/11 DISPOSAL CONFIRMED BY DATE 1111 x111+0000 RELEASED BY RECEIVED BY CHARGE NUMBER: 1000 P 5 (D SAMPLE NUMBER ب ت ١ ~

Costody Sectintact? Y. N. Nong. WHITE. COOHDINATOR / GOLDENHOD. PROJECT DIRECTOR / PINK. SAMPLE CONTROL / YELLOW. LABORATORY / BLUE. LABORATORY RECEIPT

Terp. AMBRANT

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AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510149B

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8355

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/13/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DATE COMPLETED: 10/20/95

AMOUNT\$: \$200.00

			RECEIPT	
FRACTION#	NAME	<u>TEST</u>	VAC./PRES.	PRICE
01A	TIN-030	Mod. Method 18	3.5 "Hg	\$50.00
01B	TIN-030 Duplicate	Mod. Method 18	3.5 "Hg	\$50.00
02A	TEN-031	Mod. Method 18	2.5 "Hg	\$50.00
03A	TEX-032	Mod. Method 18	1.5 "Hg	\$50.00
04A	Method Spike	Mod. Method 18	NA	NC
05A	Lab Blank	Mod. Method 18	NA	NC

CERTIFIED BY

Laboratory pirector

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 · (800) 985-5955 · FAX (916) 985-1020

Vinyl Chloride by Modified EPA Method 18 Pre-Fractionator GC/PID

Field	Lab	File	Sample	Analyzed	Dilution	Dot I imit	Amount	
Sample 1.D.	Sample I.D.	Name	Date	For	Factor	(nupv)	(nnby)	0
TIN-030	9510149B-01A	A101703	10/13/95	Vinyl Chloride	1.5	75	2600	E S
TIN-030 Duplicate	9510149B-01B	A101704	10/13/95	Vinyl Chloride	1.5	75	2400	8.0
TEN-031	9510149B-02A	A101705	10/13/95	Vinyl Chloride	1.5	75	Not Detected	¥
TEX-032	9510149B-03A	A101706	10/13/95	Vinyl Chloride	1.4	20	Not Detected	Ž
Lab Blank	9510149B-05A	A101702	Ϋ́	Vinyl Chloride	1.0	20	Not Detected	2
Spiked Sample							% December	
Method Spike	9510149B-04A	A101701	AN	Vinyl Chloride	1.0	50	80	AN AN

Analysis Date: 10/17/95

Container Type: 6 Liter Summa Canister Analyst's Initials: JS

Comments: NA = Not Applicable

COR POR POR ATEON 10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332 **KECORD**

CHAIN OF CUSTODY USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT

THIS FORM ARE ON THE BACK

DESPOSALER'S 35.4 1,51/ 75. **BTAG** DISPOSAL OC TIME 2/12/10 TYPE OF ANALYSIS DATE LABORATORY NAME & ADDRESS: 17.56 100 > ٠,٠ 7. 10-14 7 - 4 ... RELINQUISED BY PRESERVATIVE MATRIX CODE . Ł COMMENTS: **UNIT QUANTITY** / / 7: 70 TIME TIME :: (\$ ٠, OF UNITS NUMBER DATE DATE 1 BIAITIN SAMPLER'S TASK OR SUB TASK (one per form): TIME • ٠.,) ; | COLLECTION 30 . . DATE RECEIVED BY RELEASED BY CHARGE NUMBER: CONTRACT NAME: SAMPLE NUMBER 1

\$

(gone WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT WHITE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY RECEIPT WHITE - COORDINATOR / GULDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY / BLUE - LABORATORY

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PANAMENT WHOD TO DOTATE OF

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CHAIN-OF-CUSTODY RETURNED BY

TIME

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DISPOSAL CONFIRMED BY

10 113 195-114:20

AT

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9510149A

Work Order Summary

CLIENT:

Ms. Courtney Morris

BILL TO: Subcontracts Payable

Radian Corporation

Radian Corporation

10389 Old Placerville Road

P.O. Box 201088

Sacramento, CA 95827

Austin, TX 78720-1088

PHONE:

916-362-5332

INVOICE # 8355

FAX:

916-362-2318

SUBCONTRACT # 259699

DATE RECEIVED:

10/13/95

PROJECT # 269-104-18-02 McClellan Thermatrix

DECEIDE

DATE COMPLETED: 10/20/95

AMOUNT\$: \$820.00

			RECEIPT	
FRACTION #	NAME	TEST	VAC./PRES.	PRICE
01A	TIN-030	TO-14	3.5 "Hg	\$205.00
01B	TIN-030 Duplicate	TO-14	3.5 "Hg	\$205.00
02A	TEN-031	TO-14	2.5 "Hg	\$205.00
03A	TEX-032	TO-14	1.5 "Hg	\$205.00
04A	Method Spike	TO-14	NA	NC
05A	Lab Blank	TO-14	NA	NC

CERTIFIED BY

Laboratory Director

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630 (916) 985-1000 · (800) 985-5955 · FAX (916) 985-1020

SAMPLE NAME: TIN-030 ID#: 9510149A-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	1101608	Date of Collection: 10/13/95
Dil. Factor:	3800	Date of Analysis: 10/16/95
Analyst's Initials:	MH .	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	1900	Not Detected
1,1-Dichloroethene	1900	Not Detected
Freon 113	1900	Not Detected
cis-1,2-Dichloroethene	1900	19000
Chloroform	1900	Not Detected
1,1,1-Trichloroethane	1900	Not Detected
Benzene	1900	2600
Trichloroethene	1900	600000
Toluene	1900	Not Detected
Tetrachloroethene	1900	Not Detected
m,p-Xylene	1900	7900
o-Xylene	1900	6400
Acetone	7600	Not Detected

<u>Surrogates</u>		%	Recovery	Method Limits
Octafluorotoluene			116	70-130
Toluene-d8			11 4 - 100	70-130 70-130
4-Bromofluorobenz	ene		- 11	
			The state of the s	70-130

SAMPLE NAME: TIN-030 Duplicate

ID#: 9510149A-01B

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101611 Date of Collection: 10/13/95
Dil. Factor: 3800 Date of Analysis: 10/16/95
Analyst's Initials: MPG

Compound	Det. Limit (ppbv	Amount (ppbv)	RPD
Vinyl Chloride	1900	Not Detected	NA
1,1-Dichloroethene	1900	Not Detected	NA
Freon 113	1900	Not Detected	NA
cis-1,2-Dichloroethene	1900	17000	11
Chloroform	1900	Not Detected	NA
1,1,1-Trichloroethane	1900	Not Detected	NA
Benzene	1900	2300	12
Trichloroethene	1900	590000	1.7
Toluene	1900	Not Detected	NA
Tetrachloroethene	1900	Not Detected	NA
m,p-Xylene	1900	8200	3.7
o-Xylene	1900	6500	1.6
Acetone	7600	Not Detected	NA

<u>Surrogates</u>	%	Recovery Method Limits
Octafluorotoluene		115. 70-130
Toluene-d8		117 70-130
4-Bromofluorobenzene		120 70-130

SAMPLE NAME: TEN-031 ID#: 9510149A-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101609	Date of Collection: 10/13/95
Dil. Factor: 4.2	Date of Analysis: 10/16/95
Analyst's Initials:	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	2.1	Not Detected
1,1-Dichloroethene	2.1	Not Detected
Freon 113	2.1	Not Detected
cis-1,2-Dichloroethene	2.1	Not Detected
Chloroform	2.1	Not Detected
1,1,1-Trichloroethane	2.1	Not Detected
Benzene	2.1	Not Detected
Trichloroethene	2.1	Not Detected
Toluene	2.1	Not Detected
Tetrachloroethene	2.1	Not Detected
m,p-Xylene	2.1	Not Detected
o-Xylene	2.1	Not Detected
Acetone	8.4	16

Surrogates	% Recovery Method Limits
Octafluorotoluene	88 70-130
Toluene-d8	70-130
4-Bromofluorobenzene	70-130

SAMPLE NAME: TEX-032 ID#: 9510149A-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101610 Date of Collection: 10/13/95
Dil. Factor: 5.0 Date of Analysis: 10/16/95
Analyst's Initials: MPG

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	2.5	Not Detected
1,1-Dichloroethene	2.5	Not Detected
Freon 113	2.5	Not Detected
cis-1,2-Dichloroethene	2.5	Not Detected
Chloroform	2.5	Not Detected
1,1,1-Trichloroethane	2.5	Not Detected
Benzene	2.5	Not Detected
Trichloroethene	2.5	Not Detected
Toluene	2.5	Not Detected
Tetrachloroethene	2.5	Not Detected
m,p-Xylene	2.5	Not Detected
o-Xylene	2.5	Not Detected
Acetone	10	13

Surrogates	% Recovery M	ethod Limits
Octafluorotoluene	98	70-130
Toluene-d8	112	70-130
4-Bromofluorobenzene	114 %	70-130

SAMPLE NAME: Method Spike ID#: 9510149A-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101603/1101605
Dil. Factor: 1.0
Analyst's Initials: MH

Date of Collection: NA
Date of Analysis: 10/16/95

Compound	Det. Limit (ppbv)	% Recovery
Vinyl Chloride	0.50	97
1,1-Dichloroethene	0.50	104
Freon 113	0.50	113
cis-1,2-Dichloroethene	0.50	100
Chloroform	0.50	110
1,1,1-Trichloroethane	0.50	111
Benzene	0.50	115
Trichloroethene	0.50	108
Toluene	0.50	108
Tetrachloroethene	0.50	108
m,p-Xylene	0.50	81
o-Xylene	0.50	94
Acetone	2.0	129

Container Type: NA

<u>Surrogates</u>	% Recovery Method Limits
Octafluorotoluene	118 / 113 70-130
Toluene-d8	116 / 116 70-130
4-Bromofluorobenzene	114 / 116 70-130

SAMPLE NAME: Lab Blank ID#: 9510149A-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name: 1101607 Date of Collection: NA
Dil. Factor: 1.0 Date of Analysis: 10/16/95
Analyst's Initials: MH

Compound	Det. Limit (ppbv)	Amount (ppbv)
Vinyl Chloride	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Benzene	0.50	Not Detected
Trichloroethene	0.50	Not Detected
Toluene	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Acetone	2.0	Not Detected

Container Type: NA

<u>Surrogates</u>	% Recovery	Method Limits
Octafluorotoluene	110	70-130
Toluene-d8	115	70-130
4-Bromofluorobenz	ene 114 maria di 1	70-130

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CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK TASK OR SUB TASK (one per form):

C C R P O R A T I O N 10389 ROCKINGHAM ROAD, SACRAMENTO, CA 95827 (916) 362-5332

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WHÎTE - COORDINATOR / GOLDENROD - PROJECT DIRECTOR / PINK - SAMPLE CONTROL / YELLOW - LABORATORY/ BLUE - LABORATORY RECEIPT

RADIAN

SOURCE TEST REPORT MAFB Thermatrix Thermal Oxidizer NMHC, NOx, CO

Test Date: September 20, 1995

BEST ENVIRONMENTAL, INC.

15890 Foothill Boulevard San Leandro, California 94578

(510) 278-4011 FRX (510) 278-4018

September 28, 1995

RADIAN 10395 Old Placerville Road Sacramento, CA 95827

Attn: Ms. Courtney Morris

<u>Subject</u>: Report on the NOx, CO and NMHC emissions test conducted on the Thermatrix Thermal Oxidizer serving an experimental soil vapor extraction system.

Test Date: September 20, 1995.

<u>Sampling Location</u>: The source is located at the Groundwater Treatment Plant at McClellan Air Force Base, North Highlands, California. Sampling was conducted at the outlet of the 1-inch exhaust from the Oxidizer.

<u>Sampling Personnel</u>: Sampling was performed by Guy Worthington of BEST ENVIRONMENTAL, INC.

Observing Personnel: Courtney Morris was present during the set-up for the emissions test.

<u>Process Description</u>: The Thermatrix Thermal Oxidizer is used as a control device for volatile organic emissions from underground soil vapors.

<u>Test Program</u>: Testing for non-methane hydrocarbons (NMHC), nitrogen oxides (NOx), carbon monoxide (CO), oxygen (O₂) and carbon dioxide (CO₂) was performed to determine the Oxidizer emissions. Three consecutive 40-minute duration test runs were performed with calibrations before and following each run.

The stack gas volumetric flowrate and moisture content was measured at the outlet using CARB Method 2A and 4. A stainless steel/glass, corrosive resistant, high flow rotometer was used at the exhaust location to determine the exhaust flowrate. Corrections were made for temperature and moisture when calculating the standard dry cubic feet per minute (SDCFM).

Sampling and Analysis Methods: The following California Air Resources Board (CARB) sampling and analytical methods were used:

CARB Method 100

NMHC, NOx, CO, O2, CO2 continuous monitoring

CARB Method 4

Moisture Determination

CARB Method 2A

Volumetric Flowrate (Rotometer)

Instrumentation: The following continuous emission analyzers were used:

THC/CH₄ Ratfisch Model RS55 FID Total Hydrocarbon Analyzer

CO TECO Model 48 GFC Carbon Monoxide Analyzer

NOx Beckman Model 951 Chemiluminescent NO/NO₂/NOx Analyzer

CO₂ Horiba PIR-2000 Infrared CO₂ Analyzer O₂ Teledyne Model 326RAX Oxygen Analyzer

<u>Test Results</u>: Emission results for the Oxidizer are presented in Table 1. Conditions during Run #3 appeared to change. The NOx Analyzer also experienced contamination of some sort at this point and drifted significantly. Post-test calibrations of the NOx analyzer showed that the contamination was slow to clear from the equipment, and consequently no corrections were made to the NOx data from Run #3.

All supporting documentation; stack gas volumetric flowrate and moisture calculations, field data sheets, strip chart records, emission calculations, equipment calibrations and calibration gas certifications are appended to this report.

If you have any questions regarding this report, or if BEST ENVIRONMENTAL, INC., can be of any further assistance, please call.

Prepared by

Guy Worthington

Sr. Project Manager

Reviewed by

Dan Cartner

Manager

TABLE 1

RADIAN - McClellan Air Force Base
Thermatrix Soil Vapor Oxidizer

RUN #		1	,	2		3		AVERAGE	LIMITS
TEST DATE	9	9-20-95	,	9-20-95		9-20-95			
TEST LOCATION		OUTLET		OUTLET		OUTLET			
TEST TIME	1	106-1146	1	156-1236		1250-1330			
FUEL		Nat. Gas		Nat. Gas		Nat. Gas			
FLOWRATE, DSCFM		2.93		2.93		2.93	· .	2.93	
H ₂ O, %		8.0		8.0		8.0		8.0	
O ₂ , %		6.80		6.60		7.90		7.10	
CO ₂ , %		10.0		10.0		9.2		9.7	
NOx, ppm		1.9		1.8		1.4		1.7	-
NOx, g/hr		0.0181		0.0171		0.0133		0.0162	
CO, ppm	<	1.0	<	1.0	<	1.0	<	1.0	
CO, g/hr	<	0.0058	<	0.0058	<	0.0058	<	0.0058	
THC, ppm		1.6		1.6		3.8		2.3	
CH ₄ , ppm		2.0		1.0		3.0		2.0	
TNMHC, ppm	<	1.0	<	1.0	<	1.0	<	1.0	
TNMHC, g/hr	<	0.0033	<	0.0033	<	0.0033	<	0.0033	

WHERE,

CO = Carbon Monoxide (M.W. = 28)

NOx = Oxides of Nitrogen (M.W. = 46)

TNMHC = Tot. Non-Methane Hydrocarbons @CH₄ (M.W.= 16)

ppm = Parts Per Million Concentration

g/hr = Grams Per Hour Emission Rate

DSCFM = Standard Dry Cubic Feet Per Minute

Tstd = Std. Temp. °R 528

CALCULATIONS,

g/hr = 453.6 * PPM * M.W. * DSCFM * 8.22E-5 / Tstd

RADIAN

SOURCE TEST REPORT MAFB Thermatrix Thermal Oxidizer THC, NOx, CO

Test Date: October 11, 1995

BEST ENVIRONMENTAL, INC.

15890 Foothill Boulevard San Leandro, California 94578

(510) 278-4011 FAX (510) 278-4018

October 25, 1995

RADIAN 10395 Old Placerville Road Sacramento, CA 95827

Attn: Ms. Courtney Morris

Subject: R

Report on the NOx, CO and THC emissions test conducted on the Thermatrix

Thermal Oxidizer serving an experimental soil vapor extraction system.

Test Date: October 11, 1995.

Sampling Location: The source is located at the Groundwater Treatment Plant at McClellan Air Force Base, North Highlands, California. Sampling was conducted at the outlet of the 1.5 to 2 inch diameter pipe exhaust from the Oxidizer.

<u>Sampling Personnel</u>: Sampling was performed by Guy Worthington of BEST ENVIRONMENTAL, INC.

Observing Personnel: Stuart Freeman of RADIAN was onsite during a portion of the test.

<u>Process Description</u>: The Thermatrix Thermal Oxidizer is used as a control device for volatile organic emissions from underground soil vapors.

<u>Test Program</u>: Testing for total hydrocarbons (THC), nitrogen oxides (NOx), carbon monoxide (CO), oxygen (O₂) and carbon dioxide (CO₂) was performed to determine the Oxidizer emissions. Three consecutive 40-minute duration test runs were performed with calibrations before and following each run.

The stack gas volumetric flow rate and moisture content was measured at the outlet using CARB Method 2A and 4. A stainless steel/glass, corrosive resistant, high flow rotometer was used at the exhaust location to determine the exhaust flow rate. Corrections were made for temperature and moisture when calculating the standard dry cubic feet per minute (SDCFM).

<u>Sampling and Analysis Methods</u>: The following California Air Resources Board (CARB) sampling and analytical methods were used:

CARB Method 100

THC, NOx, CO, O2, CO2 continuous monitoring

CARB Method 4

Moisture Determination

CARB Method 2A

Volumetric Flow Rate (Rotometer)

<u>Instrumentation</u>: The following continuous emission analyzers were used:

THC	TECO Model 51 FID Total Hydrocarbon Analyzer
CO	TECO Model 48 GFC Carbon Monoxide Analyzer
NOx	TECO Model 10 Chemiluminescent NO/NO ₂ /NOx Analyzer
CO_2	Horiba PIR-2000 Infrared CO ₂ Analyzer
O_2	Infrared Model 2200 Fuel Cell Oxygen Analyzer

<u>Test Results</u>: Emission results for the Oxidizer are presented in Table 1. Carbon monoxide emissions registered negative emission concentrations, which can be attributed to a negative interference from CO₂ in the process exhaust. Historical interference checks have shown -0.5 ppm bias in the presence of 10% CO₂. Since the total hydrocarbons were negligible, the CO emissions are most likely also neglible.

All supporting documentation; stack gas volumetric flow rate and moisture calculations, field data sheets, strip chart records, emission calculations, equipment calibrations and calibration gas certifications are appended to this report.

If you have any questions regarding this report, or if BEST ENVIRONMENTAL, INC., can be of any further assistance, please call.

Prepared by

Guy Worthington

Sr. Project Manager

Reviewed by

Regan Best

Manager

TABLE 1

RADIAN – McClellan Air Force Base
Thermatrix Soil Vapor Oxidizer

RUN #		1		2		3		AVERAGE	LIMITS
TEST DATE		10-11-95		10-11-95		10-11-95			
TEST LOCATION		OUTLET		OUTLET		OUTLET			
TEST TIME		1212-1252		1305-1345		1355-1435			
FUEL		Nat. Gas		Nat. Gas		Nat. Gas			
FLOWRATE, DSCFM		2.93		2.93		2.93		2.93	
H ₂ O, %		8.97		8.97		8.97		9.0	
O ₂ , %		9.30	-	9.80		10.30		9.80	
CO ₂ , %		9.6		9.3		9.2		9.4	
NOx, ppm		. 0.8		1.0		0.7		0.8	
NOx, g/hr		0.0076		0.0095		0.0067		0.0079	
CO, ppm	<	0.5	<	0.5	<	0.5	<	0.5	
CO, g/hr	<	0.0029	<	0.0029	<	0.0029	<	0.0029	
THC, ppm		0.1		0.8		1.0		0.6	
CH ₄ , ppm		N.M.	.,	N.M.		N.M.		N.M.	
THC, g/hr		0.0003		0.0026		0.0033		0.0021	

WHERE,

CO = Carbon Monoxide (M.W. = 28)

NOx = Oxides of Nitrogen (M.W.= 46)

THC = Total Hydrocarbons @CH₄ (M.W.= 16)

ppm = Parts Per Million Concentration

g/hr = Grams Per Hour Emission Rate

DSCFM = Standard Dry Cubic Feet Per Minute

N.M. = Not Measured

Tstd = Std. Temp. °R 528

CALCULATIONS,

g/hr = 453.6 * PPM * M.W. * DSCFM * 8.22E-5 / Tstd

TECHNICAL MEMORANDUM

TO:

Courtney Morris

FROM:

Judy Nottoli M 6

COPY:

Lisa LaFe, Rich Howell

DATE:

November 8, 1995

SUBJECT: Source Testing Results of the Thermatrix Flameless Thermal Oxidation

System

Description of the Test Program

Hydrogen chloride (HCl) emission testing was performed by Radian on the Thermatrix Flameless Thermal Oxidation System at McClellan Air Force Base (AFB). generated by the Thermatrix System when chlorinated VOCs (e.g., trichloroethene [TCE]) in the soil vapor extraction (SVE) offgas are oxidized and the chlorine is converted to HCl. The purpose of this sampling effort was to determine HCl emissions from the system while it was treating SVE offgas. The allowable HCl emission limit for this source is 0.6 lb/hr, as per the Sacramento Metropolitan Air Quality Management District (SMAQMD).

Radian Corporation performed the testing on two different days, September 22 (Week 1 of the treatability test) and October 6, 1995 (Week 3). Three sampling runs and a field blank were collected during each of the two sampling events. During the first sampling event on September 22, 1995, the Radian sampling team (Lisa LaFe and Rich Howell) arrived at the site and set up the testing equipment. Sampling was initiated at 08:36 and was completed at 12:48. No sampling problems were encountered. However, significant corrosion of the exhaust stack was noted. Following the first sampling event, the 1-inch diameter exhaust stack was replaced with a 1.5-inch diameter stack.

On October 5, 1995, the day before the second sampling event, the Thermatrix system was off-line due to a power outage. The system operated on the same electrical circuit as a near-by catalytic oxidation (Catox) unit, which tripped the circuit breaker. On October 6, the Thermatrix unit was restarted at 09:00 and ambient air was passed through the system. At 13:30, SVE offgas was introduced to the system. At 15:00, the Thermatrix system shut down again due to the Catox power problem. The power supply configuration for the Thermatrix was then revised (i.e., an independent circuit was used) and the system was restarted. Sampling was initiated once the system's oxidation temperature reached 1600 °F. Lisa LaFe and Stuart Freeman of Radian Corporation performed three HCl emission tests between 15:35 and 18:00.

RADIAN

Courtney Morris November 8, 1995 Page 2

HCl emissions from the Thermatrix system were measured according to California Air Resources Board (CARB) Method 421. Exhaust gas was drawn from the stack through a series of four impingers. The first two impingers contained 100 milliliters of sodium carbonate buffer solution, the third impinger was empty, and the fourth impinger contained approximately 200 grams of silica gel. Following sample collection, the sodium carbonate solution was recovered from the impingers and analyzed for the chloride anion using ion chromatography coupled with a conductivity detector. The samples were analyzed by Radian's analytical laboratory in Summit Park, Texas according to California Air Resource Board (CARB) Method 421.

Samples were collected anisokinetically at a single point in the exhaust stack. This was not expected to have affected the test results because particulate emissions from the unit are negligible and no droplets were present in the gas stream. Multiple point sampling was not feasible because of the relatively small stack diameter.

Stack gas velocity and moisture content were determined during each test run. Velocity was determined using a pitot tube/manometer/thermocouple assembly. Oxygen and carbon dioxide concentrations were determined with a Fyrite apparatus. Moisture content was determined based on the impinger weight gain and volume of gas sampled.

Test Results

Results of the emission testing are summarized in Table 1. Supporting calculations and field data sheets are presented in Attachment A; laboratory data and chain-of-custody forms are presented in Attachment B; equipment calibration data are included in Attachment C.

HCl emissions ranged from 0.083 to 0.096 lb/hr, and averaged 0.092 lb/hr during Sampling Event 1 (i.e., September 22). Lower emissions were observed during Sampling Event 2 (i.e., October 6), ranging from 0.041 to 0.051 lb/hr and averaging 0.045 lb/hr. Emissions were well below the 0.6 lb/hr SMAQMD limit during both sampling events. HCl concentrations in the exhaust gas decreased slightly from 107 mg/dscf (3-test average) during Sampling Event 1 to 83 mg/dscf during Sampling Event 2.

Emissions were relatively consistent during Event 1; more variability was observed during the Event 2 tests, as emissions increased from Test 1 (0.041 lb/hr) to Test 3 (0.051 lb/hr). This may be related to the Thermatrix system outage that occurred prior to the Event 2 tests. Note that the Test 3 HCl exhaust gas concentration (99 mg/dscf) is comparable to the Event 1 exhaust gas concentrations.

RADIAN

Courtney Morris November 8, 1995 Page 3

Exhaust gas flow rates decreased from 6.5 dscfm during Sampling Event 1 to 4.1 dscfm during Event 2; the exhaust gas temperature similarly decreased from 234°F (Event 1) to 121°F (Event 2). Stack gas characteristics (i.e., moisture content; O_2 and CO_2 concentrations) were comparable during the two test events.

Review of the quality assurance/quality control (QA/QC) data presented in Attachments A through C reveals that the quality of the data was acceptable. Specifically, sampling train leak checks, sampling conditions, and equipment calibrations were within method-specified limits. Similarly, the analytical QA/QC data were acceptable. Results of the duplicate, spike and blank sample analyses are presented in Attachment B.



Table 1

Source Testing Parameters and Hydrogen Chloride Emission Data

			Sampling Eve	Sampling Event 1 (9/22/95)			Sampling Event 2 (10/6/95)	nt 2 (10/6/95)	
Parameter	Units	Run 1	Run 2	Run 3	Average	Rum 1	Run 2	Run 3	Average
Run time	NA	0836-0941	1029-1129	1148-1248		1535-1605	1640-1710	1730-1800	
Sample volume	dscf	27.85	28.39	27.98	28.07	13.86	14.15	14.19	14.07
Stack gas velocity	ft/sec	26.8	30.1	28.1	28.3	7.0	6.7	6.4	6.7
Volumetric flow rate	dscfm	6.3	6.9	6.4	6.5	4.3	4.1	3.9	4.1
Stack gas temperature	٦°	230	237	235	234	120	120	122	121
Stack gas moisture	%	8.9	7.5	8.2	7.5	7.3	8.1	7.4	7.6
co;	%	7.2	7.2	7.2	7.2	8.0	8.0	8.0	8.0
0,	%	8.9	8.9	8.9	6.8	9.0	9.0	9.0	9.0
HCl concentration	mg/dscf	100	108	113	107	72	79	66	83
HCl emission rate	lb/hr	0.083	0.098	960'0	0.092	0.041	0.043	0.051	0.045

NA dscfm CO, O,

not applicabledry standard cubic feet per minutecarbon dioxide

= oxygen

fl/sec = feet per second mg/dscf = milligrams per dry standard cubic feet lb/hr = pounds per hour

ATTACHMENT A SUPPORTING CALCULATIONS AND FIELD DATA SHEETS

NOMENCLATURE

acfm Actual Cubic Feet per Minute

P_{bar} Barometric Pressure

ft/sec Feet per Second

g/mole Grams per Gram-Mole

H₂O Water Vapor Concentration

ug Micrograms

lb/hr Pounds per Hour

kg/hr Kilograms per Hour

gm/sec Grams per Second

N₂, CO₂, O₂ Nitrogen, Carbon Dioxide, Oxygen Concentration

ppmv Parts per Million by Volume

ug/dscf Micrograms per dry standard cubic feet

PTCF Pitot Tube Calibration Factor

DGMCF Dry Gas Meter Calibration Factor

dscfm Standard Cubic Feet per Minute (dry basis)

dscf Standard Cubic Feet (dry basis)

deg F Degrees Fahrenheit

cu. ft Cubic Feet (as measured)

HCl Hydrochloric acid

ΔP Velocity Pressure

ΔH Pressure drop across the orifice meter

Table A-1. Thermatrix: Hydrogen Chloride Emission Data - Sampling Event 1

Run Number			#1	#2	#3	
Date			09/22/95	09/22/95	09/22/95	Event 1
Time			0836-0941	1029-1129	1148-1248	Avg.
DGMCF ()=	1.012	1.012	1.012	1.012
Dry Gas Meter Volume (cu. ft.)=	27.89	29.06	29.00	28.65
PTCF ()=	0.99	0.99	0.99	0.99
Barometric Pressure (" Hg)=	29.90	29.90	29.90	29.90
Impinger Weight Gain (grams)=	43	49	53	48
Percent Oxygen (% O2)=	6.8	6.8	6.8	6. 8
Percent Carbon Dioxide (% CO2)=	7.2	7.2	7.2	7.2
Average Delta H (" H2O)=	0.65	0.80	0.80	0.75
Pressure at Meter (" Hg)=	29.95	29.96	29.96	29.96
Pressure in Stack (" H2O)=	0.36	0.34	0.34	0.35
Temp at Meter (deg F)=	76	88	95	86
Temp in Stack (deg F)=	230	237	235	234
Sq Rt Stack Gas Vel Press ((a))=	0.353	0.394	0.367	0.371
Standard Temp (deg F)=	68.0	68.0	68.0	68.0
Standard Pressure (" Hg)=	29.92	29.92	29.92	29.92
Diameter of Stack (feet)=	0.083	0.083	0.083	0.083
Volume of Gas Sampled (dscf)=	27.85	28.39	27.98	28.08
Moisture Fraction (% H2O)=	6.8%	7.5%	8.2%	7.5%
Gas Molecular Weight (g/mole)=	28.64	28.56	28.48	28.56
Stack Gas Velocity (ft/sec)=	26.8	30.1	28.1	28.3
Volumetric Stack Gas Flow (acfm)=	8.8	9.8	9.2	9.3
Volumetric Stack Gas Flow (dscfm)=	6.3	6.9	6.4	6.5
Hydrogen Chloride Emission Data					***************************************	
Quantity Chloride Collected (ug)		-	2,710,000	2,970,000	3,075,000 b	2,918,333
Quantity HCl Collected (ug)			2,785,880	3,053,160	3,161,100	3,000,047
Concentration (ug/dscf)			100,021	107,531	112,959	106,837
Emission Rate (gm/sec)			0.010	0.012	0.012	0.012
Emission Rate (kg/hr)			0.038	0.044	0.043	0.042
Emission Rate (lb/hr)			0.083	0.098	0.096	0.092

⁽a) (in.H2O)**0.5

⁽b) Run 3 represents the average result of duplicate analyses (refer to the laboratory data in Attachment B).

Table A-2. Thermatrix: Hydrogen Chloride Emission Data - Sampling Event 2

Run Number			#1	#2	#3	
Date		,	10/06/95	10/06/95	10/06/95	Event 2
Time			1535-1605	1640-1710	1730-1800	Avg.
DGMCF ()=	0.998	0.998	0.998	0.998
Dry Gas Meter Volume (cu. ft.)=	14.49	14.69	14.70	14.62
PTCF ()=	0.99	0.99	0.99	0.99
Barometric Pressure (" Hg)=	29. 81	29.81	29.81	29.81
Impinger Weight Gain (grams)=	23	27	24	25
Percent Oxygen (% O2)=	9.0	9.0	9.0	9.0
Percent Carbon Dioxide (% CO2)=	8.0	8.0	8.0	8.0
Average Delta H (" H2O)=	0.80	0.80	0.80	0.80
Pressure at Meter (" Hg)=	29.87	29.87	29.87	29.87
Pressure in Stack (" H2O)=	0.03	0.01	0.01	0.01
Temp at Meter (deg F)=	90	86	85	87
Temp in Stack (deg F)=	120	120	122	121
Sq Rt Stack Gas Vel Press ((a))=	0.100	0.096	0.091	0.096
Standard Temp (deg F)=	68.0	68.0	68.0	68.0
Standard Pressure (" Hg)=	29.92	29.92	29.92	29.92
Diameter of Stack (feet)=	0.125	0.125	0.125	0.125
Volume of Con Samuel 1	1 - C		10.00			
Volume of Gas Sampled (dscf)=	13.86	14.15	14.19	14.07
Moisture Fraction (% H2O)=	7.3%	8.1%	7.4%	7.6%
Gas Molecular Weight (g/mole)=	28.80	28.70	28.77	28.76
Stack Gas Velocity ()=	7.0	6.7	6.4	6.7
Volumetric Stack Gas Flow (acfm)=	5.1	4.9	4.7	4.9
Volumetric Stack Gas Flow (dscfm)=	4.3	4.1	3.9	4.1
Hydrogen Chloride Emission Data	·					
Quantity Chloride Collected (ug)		•	968,000	1,090,000	b 1,370,000	1,142,667
Quantity HCl Collected (ug)			995,104	. ,		
			993,104	1,120,520	1,408,360	1,174,661
Concentration (mg/dscf)			71,810	79,161	99,232	83,401
Emission Rate (gm/sec)			0.005	0.005	0.006	0.006
Emission Rate (kg/hr)			0.019	0.019	0.023	0.020
Emission Rate (lb/hr)			0.041	0.043	0.051	0.045

⁽a) (in.H2O)**0.5

⁽b) Run 2 represents the average result of duplicate analyses (refer to the laboratory data in Appendix B).

GENERAL COMPUTATION SHEET

CLIENT NAME Thermatrix PROJECT NAME ___

CALCULATION SET Final Sheet Charge #

Calculation Validation (Test #2, 9/22/95)

Calculate HCl emissions in mg/dset and 16/hr given the input date presented in Table A-1:

1) Calculate the sample gas volume, corrected to salstandard conditions, given:

$$\Delta V = 29.06 \text{ ft}^3 \text{ (as measured)}$$

$$8 = 1.012$$
 $T_m = 88^{\circ}F + 460 = 548^{\circ}R$
 $T_{std} = 528^{\circ}R$
 $P_{std} = 29.92 \text{ in the}$

$$AV_{std}$$
 = $\Delta V \times V \times \left(\frac{528}{548}\right) \times \left(\frac{29.96}{29.95}\right)$
= $29.66 \times 1.012 \left(\frac{528}{548}\right) \left(\frac{29.96}{29.95}\right) = 28.37 \text{ dscf}$

(5) Calculate the stack gas moisture content (Bw), given 1/2=49 n/s $B_{\omega} = \frac{0.0473(49)}{70.0473(49) + 28.37} \times 100$

(3) Calculate Stack gas relocity (Vs) and flow, given Cp = 0.49 √ΔPV = 0.394 (in. H, D) = T3 = 237+460 = 697 °R

GENERAL COMPUTATION SHEET

CA	ALCULATIO	N SET
Prelim	l	
Final		
Sheet	2 Of	3
Charg	e#	
Rev.	Comp. By	Chk'd By
	114	
	Date	Date
	11	
	Date	Date

$$P_{S} = P_{bar} + P_{Stat}/13.6 = 29.90 + 0.34/13.6 = 29.93 in. Hg$$
 $M_{J} = 0.44 \times 200_{3} + 0.32 \times 200_{2} + 0.28(100 - (9.03 + 200_{3}))$
 $= 0.44 \times 7.2 + 0.32 \times 6.8 + 0.28(86) = 29.42.16/16-m$
 $M_{S} = 29.42(1-0.0758) + 18(6.0758) = 28.56.16/16-mde$
 $A_{S} = \pi (\frac{1}{2})^{2}/144 = 5.454 \times 10^{-3} f^{2}$

(wetbess)

$$V_{s} = 85.49 (Cp) (VaP_{s}) \left[\frac{T_{s}}{P_{s}} m_{s} \right]^{\frac{1}{2}}$$

$$= 85.49 (0.99)(0.394) \left[\frac{697}{697.93} (0.98.56) \right]^{\frac{1}{2}}$$

$$= 30.11 \text{ ff/sec}$$

$$Q_{ACFM} = V_{s} \times 60 \times A_{s}$$

$$= 30.11 \times 60 \times (5.454 \times 10^{-3})$$

$$= 9.85 \text{ ACFM}$$

$$Q_{BSCFM} = Q_{ACFM} \times \left(\frac{528}{29.93} \right) \times \frac{P_{s}}{T_{s}} \times \left(1 - \frac{136}{100} \right)$$

$$= 9.85 \times 528/29.92 \times 29.93/697 \times (0.9245)$$

$$= 6.90 \text{ dscfm}$$

Describe the emissions (mg/dscf, b/hr) given
$$Cl = 2,970 \text{ mg}$$

$$HCl = 2,970 \times 36.55.5 = 3,054 \text{ mg}.$$

GENERAL COMPUTATION SHEET

PROJECT NAME Theinatrix

C	ALCULATIO	N SET
Prelim	l.	
Final		
Sheet	3 Of	3
Charg	e#	
Rev.	Comp. By	Chk'd By
	111	
	Date N & Q	Date
	1-10	
	Date	Date

FIELD DATA SHEETS

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FIELD 1	

PAGE 1 OF /

PLANT	McClellon	MCCIELLA PROBELENGTH AND TYPE TESTON THEIGHT OF LOCATION (M)	TC4105 Lake	HEIGHT OF LOCATION (R)	, ,	
DATE	928.95	9-32-45 NOZZLEI.D. (In)	-	DUCT DIMENSIONS	I inch - claust	clauste
SAMPLING LOCATION	Them to X	The Christ House METER BOX NUMBER	50-745	SAC-05 FILTER NUMBER	į	
SAMPLE TYPE	TC-L	METER A HO	b&1-	- 1,29 ASSUMED MOISTURE (%)	ļ	
RUN NUMBER		Pλ	T1011	1, Ot 2 MOISTURE METHOD	אים אים ישושים	
OPERATOR	AAH LOL KFACTOR	K FACTOR		_	43,4 m1	
AMBIENT TEMPERATURE	75	PROBE HEATER SETTING	}	O2/CO2 METHOD	Pyr. he	
BAROMETRIC PRESSURE	2990	HEATER BOX SETTING	1	02	6.8	
STATIC PRESSURE (Pe)	0.36	و		CO2	4.۲	
INITIAL LEAKCHECK	0.001 CFM @# "49	e ₩ "#9		FINAL LEAKCHECK	0.002 CFM & 3 179	487.49
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Traverse	Sempling	Clock	Gae Meter	Velocity	-	Ortfice			Temperature (*F)		
Point	Time	Time	Reading	Heed	986	· Preseure	E E	Dry Ge	Dry Gas Meter		Рипр
Number	(SIE)	(24-hr)	(Vm), cu.R	?	Temperature	Differential	Temperature	File	Outlet	Impinger	Vacuum
	0	0836	851.676	m. H20	(- 1)	(4 H, In. H2O)	(•F)	(Tm ln)	(Tm out)	Ext	(F. Hg)
4	L.	1480	035,03	1	1	0.50	l	68	89	70	
-	/0/	9480	855.450	/	ł	0.50)	20	69	89	
	1,5	0851	857.350	l	1	0.50	ı	1/2	0,2	9.5	\
	10	0856	859.250	1	/	0.50	l	23	14	63	\
	25	1060	021.198	1	1	0.50	,	25	72	63	
	70	9060	863 400	ı	-	0.70	,	26	64.	61	\
	35	1160	865.660	,	l	0.70	1	82	74	/9	
	700	9/60	867.900	(/	0.70		29	52	19	
_	45	0921	870.150	1	1	0.70	1	80	26	62	
	0.5	0916	872 390	1	1	0.70	,	18	92	64	
	3,5	0931	874.800	1	1	0,80	,	83	82	८८	\
	09	72.50	877 170	1)	0.80	l	48	. 64	2.9	\
>	65	1460	879.564	,	1	08.0	ţ	8.6	80	67	
4.1.1.1	72/		CCF FC - V						7 7		

comments: Note: canisher sample collected at hegising of randy state

METHOD 5 FIELD DATA

RUN	PAGE OF

				PLANT							
				DATE							
				SAMPLING LOCATION	CATION						
				SAMPLE TYPE	ш						
				RUN NUMBER	æ						
				OPERATOR							
		Clock	Gae Meter	Velocity	<u>g</u>	Orifice			Temperature (*F)		
Poline	T T		Peeding		8	Preseure	FIRe	Dry Gae Meter	Motor		٤
umber	(ujw.)	(24-hr)	(Vm), ou.R	3	Temperature	Differential	Temperature	rater	Outlet	Impinger	>
				F. H20	6.)	(. H. m. H2O)	(•F)	(Tm In)	(Tm out)	Exh	٤
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Revision: 11/80

COMMENTS:

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PAGE 1 OF

PLANT	N5/10/13W	ACC/C // SA PROBELENGTH AND TYPE	2, 105/109	2' 101/01 HEIGHT OF LOCATION (R)	٦,
DATE	7-22.95	7 - 3.2.55 NOZZLE I.D. (In)	1	DUCT DIMENSIONS	11116
SAMPLING LOCATION	ther nate: x	Ther natrix METER BOX NUMBER	540.05	SAC 05 FILTER NUMBER	1
SAMPLE TYPE	ACC	METER 4 H®	1.39 ~	ASSUMED MOISTURE (%)	1
RUN NUMBER	43	λď	1.012	1,0/2 MOISTURE METHOD	imp. ngcr agh
OPERATOR	BAH. LOL KFACTOR	K FACTOR	-	MOISTURE DATA	48.8 mi
AMBIENT TEMPERATURE	70°	PROBE HEATER BETTING	j	O2/CO2 METHOD	Fyr. R.
BAROMETRIC PRESSURE	2570	HEATER BOX SETTING	J	02	6.8
STATIC PRESSURE (Pe)	0.34			CO2	7.9
INITIAL LEAKCHECK	0.005 CFA @ 5" Hg	C 5" 49		FINAL LEAKCHECK	Ocosofon es
		`			

READ AND RECORD ALL DATA EVERY 5 MINUTES

									1		-
Traverse	Sampling	Clock	Gas Meter	Velocity	Flue	Ortifice	1		Temperature (*F)		
Point	Time	Time	Reading	Heed	986	· Preseure	Filler	Dry Ge	Dry Gae Meter		Pemp
Number	(mlm)	(24-hr)	(Vm), cu.R	B)	Temperature	Differential	Temperature	To lot	Outlet	Impinger	Vacuum
	0	6701	880.940	h. H20	(•F)	(4 H. In. H2O)	(•P)	(Tm in)	(Tm out)	Ext	(În. Hg)
¥	70	1034	883.350	,	,	0.80	J	83	52	74	7 2
-	9	6101	885.870	ر	1	0.80	ι	63	82	19	2.5
	ار	707	888.150	1	,	0.80	1	58	83	/9	2.5
+	207	6701	890.560	,	/	0.80	,	87	48	62	2.5
	1.5	730/	086 868	,	1	08.0	ı	88	48	19	4.5
-	202	6301	0/4 358	,)	08.0	,	06	85	19	2.5
	35	1011	897.8/0	 	1	0.80	ł	./6	9,8	/9	2.5
	2	6011	900.230	,	,	08.0	ł	13	87	62	8.5
	47	7//1	099.706	,	1	0.80	Ł	66	87	59	4.5
	200	6111	705.060	,	1	0.80	Į	6)	88	60	2.5
	3 4	1,24	907 450)	l	08.0	ı	46	68	19	2.5
 		200	366 606)	1	0.80	1	49	68	09	£. 5
•	00	101	2//:/2/								
			1 2 CV			VO V			27 6		
ZA VE	09		A1,035			2,5			1.6.1.		The second secon

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METHOD 5 FIELD DATA

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10:56 4 SCFH NG. MAG GAUGE 0,85 MK+ EMP 1560F		Pamp	Vecuum (in. Ha)		-										Revision: 11/00
111/2+ 72m/1 19607			Impinger Ext												€ .
	Temperature (*F)	Aeter	Oute	, , , , , , , , , , , , , , , , , , ,											
	2	Dry Gae Meter	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1												
			Temperature	6.2											
	Orifice	Preseure		(A M. M. DZO)				·							
NOTTON	Plue	•	•	£ .											
PLANT DATE SAMPLING LOCATION SAMPLE TYPE RUN NUMBER OPERATOR	Vetocity	Pee H		F. H20											
	Gae Meter	Peeding	(Vm), ou.R							-					
	Clock	Time	(24-hr)												
	Sempling	Time.	(min)												
	Traverse	Point	Number												COMMENTS:

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PLANT	mc (101150	M. C. 11/1/5 M PROBE LENGTH AND TYPE 12 YENOW 17 HEIGHT OF LOCATION (A)	2 Yer101	HEIGHT OF LOCATION (R)	4.
DATE	56.88.6	9. 1.2.95 NOZZLEI.D. (in)	1	DUCT DIMENSIONS	1 inch
SAMPLING LOCATION	theematoix	THE COND FOLK METER BOX NUMBER	540.05	SAC . O.S FILTER NUMBER)
SAMPLE TYPE	HC L	METER 4 H®	1.39 -	ASSUMED MOISTURE (%)	1
RUN NUMBER		PA	1.012	MOISTURE METHOD	imp gain
OPERATOR	MAH - LOL KFACTOR	K FACTOR	ì	MOISTURE DATA	53.1 ml
AMBIENT TEMPERATURE	308	PROBE HEATER BETTING	1	O2/CO2 METHOD	6 4 Fyr. 15
BAROMETRIC PRESSURE	29.90	HEATER BOX SETTING	į	02	7.56.8
STATIC PRESSURE (Pe)	+			2002	7.2
INITIAL LEAKCHECK	0.005 CEN	0.005 cfn @ 3" 45		FINAL LEAKCHECK	0,007 CKM

READ AND RECORD ALL DATA EVERY MINUTES

Transfer	o cijume o		Gae Meter	Velocity	3	Orifice		-	Temperature (*F)		
Polnt	Time	1 m	Pending	Heed		- Preseure	Filter	Dry Gas Meter	• Motor		Pump
Number	(mfm)	(24-hr)	(Vm), cu.ft	3	Temperature	Differential	Temperature	Inlet	Outlet	Impinger	Vecuum
	C	8411	409.822	h. H20	(P.)	(4 H, In. H2O)	(.	(Tm in)	(Tm out)	Ē	(jr. Hg)
P	نم	1153	1	J	1	08.0		92	90	08	2.5
7	, ,	1158	9/4.720	,	,	0.80	i	93	9.0	63	2.5
	2/4/	1303	6/1/150	1	/	0.80	ı	63	16	/9	8
	100	1708	919 550	1	1	0.80	,	-56	16	62	Z
	267	1771	412 000)	1	0.80	į	65	93	62	4
	200	11/8	014.416	Į		08.0	!	85	9.3	63	7
	35	1223	926.830	?	1	080	(66	46	09	7
	707	1228	919.20	j)	08.0	ı	66	95	55	×
	27	12.33	931.650	1	1	0.80	,	66	45	85	4
	0.4	1238	974,070	,	1	08.0	l	86	46	24	8
	24	1247	976. 490))	0.80	1	66	55	62	8
	97	8481	918.925	1)	0,80	l	001	96	63	8
			64.00			8			94495		
No / Net	₹ 7		C00, P&			2,02				The second secon	

METHOD 5 FIELD DATA

PAGE__OF

RADIAN

12:30 04 5.6h MAGGAUGE 6.65 Inlet Temp = 170

JN NUMBER	ATE	LANT	PLANT DATE SAMPLING LOCATION SAMPLE TYPE RUN NUMBER
	MAPLING LOCATION	ATE AMPLING LOCATION	AMPLE TYPE
WPLETYPE		ATE	AMPLING LOCATION

Time Time (24-hr) (Vml), cui. R (a. Ph.). Temperature Differential Temperature Internation (29-hr) (Tm out) (Tm	Traverse	Sampling	Clock	Gae Moter	Velocity	9 5	Orifice			Temperature (°F)		
(min) (24-hr) (Vm), out.R (x Pt) Temporature Differential Temporature Differential Temporature Impliger In H2O (*P) (x H, In, H2O) (*P) (Tm in) (Tm out) Edit In H2O (*P) (x H, In, H2O) (*P) (Tm in) (Tm out) Edit In H2O (*P) (*A, In, H2O) (*A, In, H2O) (*A, In, H2O) (*A) (*A) In H2O (*A) (*A) (*A) (*A) (Point	Time	Time	Reading	T Pee	•	Preseure	FIRE	Dry Ge	• Motor		Pemp
Part	Vumber	(cjE)	(24-hr)	(Vm), cu.R		Temperature	Differential	Temperature	· Inlet	Outlet	Implinger	Vacuum
					In. H20	(•F)	(+ H. m. H2O)	(•P)	(Tm in)	(Tm out)	Ext	(in. Hg)
							•					
	-											

#1 36 #2 34

Velocity Traverse Data Sheet

ALMIT_	McClellan
DATE	9-22-95
LOCATION	Thermatrix
	1.0 inch
BARCHETA	HC PRESSURE IN ME 24 90
STACK GAL	IGE PRESSURE. a. N-O
OPERATOR	BAHILDL

SCHEMATIC OF TRAVERSE POINT LAYOUT

#	TRAVERSE POINT NUMBER	VELOCITY HEAD LOGIL IS NO	STACK TEMPERATURE (T _s), °F	on stack Temp gauge	TRAVERSE POINT NAMER	MEAD MANTO	STACK TEMPERATURE (T _g), *F
151 65° T	2	10.13	2+9 (dig	H)155°F			
= 128°F = 230°F		!					
- 200 F				† †			
m C 36							
7	,	0.15		on stack			
68°F	2	0.76		5495c = 1656F			
19]=237°F 2.8FpM							
7.34							
		0.14		un Stack			
134 - 80°F = 130°F	1	0.13		170°F			
= 225° %							
-		i		7			
0.34	AVERAGE	[=	AVERAGE		



METHOD 5 FIELD DATA

RUN /

PLANT	Thermoter	REGION FLUX PROBE LENGTH AND TYPE 24 1/7 ett. 1 HEIGHT OF LOCATION (R)	24"/Tetto1	HEIGHT OF LOCATION (R)	3 (
DATE	51/9/01	(3/6/15 NOZZLE I.D. (In)	-,	DUCT DIMENSIONS	1.5"	
SAMPLING LOCATION	534164	6 J+ 16, + METER BOX NUMBER	10-245	SAC O / FILTER NUMBER		
SAMPLE TYPE	HCL	METER . HØ	1.894	ASSUMED MOISTURE (%)	1	
RUN NUMBER)	PA	0,998	6,998 MOISTURE METHOD	ושים עובי עמים	
OPERATOR	SAF/LOL KFACTOR	KFACTOR	1	MOISTURE DATA	23m	
AMBIENT TEMPERATURE	3.08	SO F PROBE HEATER BETTING	į	O2/CO2 METHOD	Fyrite	
BAROMETRIC PRESSURE	29.81	HEATER BOX SETTING		02	9%	
STATIC PRESSURE (Pe)	0,03			202	0,0	:
INITIAL LEAKCHECK	0.005 B S"H	5"/4		FINAL LEAKCHECK	0.005 C 5"H5	21.42
		_				\

READ AND RECORD ALL DATA EVERY λ -S MINUTES

Traverse	Sempling	Clock	Gas Motor	Vetocity	Flue	Orifice		* !	Temperature (*F)		
Point	Time	Time	Reading	Нове	8	· Preseure	Filly	Dry Ge	Dry Gas Meter		Pump
Number	(EjE)	(24-hr)	(Vm), cu.R	(• /•)	Temperature	Differential	Temperature	tolet	Orațec	Impinger	Vacuum
	۵	1535	629.31	In/ H20	(•F)	(. H, in. H2O)	(°F)	(Tm In)	(Tm out)	Ext *	(in. Hg)
	٧.	1537.5			08/	. 8 6		42	スチ	45.	ره/
1	6	0451	631.5		081	.80		23	80	89	78
	25	75451	632.7		0×1	08,		72	که کا	63	٧.
	0/	3431	633.9		07/	08.		9.1	57	/,	7
	12.5	1547.5	1		(20	08'		90	85	11	J
	5/	7550	636.3		(10	08.		91	63	21	7
	17.5	(5525)			07/	08.		94	80	۶,۲	7
	20	255/			04)	03.		91	58	68	ci
	22.5	5.5351	640.0		120	03·		۶ (68	86	7
	25	0091	641.2		02/	08.		91	88	84	7
	27.5				120	08.		9.	ەر م	66	2
	30	<u> </u>	643.79		120	08.		16	88	86	~
-											
Ma Net	30	Ψ.	98 h'h1		120	0.30			29.9		
COMMENTS:	* Impinger box	i box (Ced	ed cin		1 harmacouple	1) v (s)	clirect SUN	. 5		æ	Revision: 11/90

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Ī		_

PAGE 1 OF

PLANT	The Same POIN	The state Height of LOCATION (A)	24"/retion	HEIGHT OF LOCATION (f)	3,	
DATE	10/0/	NOZZLE I.D. (In)	, 1	DUCT DIMENSIONS	/.5./	
SAMPLING LOCATION	Cirler	METER BOX NUMBER	10-01S	SAC-O/ FILTER NUMBER	1	
SAMPLE TYPE		METER 4 H®	1,894	ASSUMED MOISTURE (%)	inpimer gan	
RUN NUMBER	4	PA	0.278	6,998 MOISTURE METHOD	7	
OPERATOR	CAF	K FACTOR	١	MOISTUREDATA	26.5 mg	
AMBIENT TEMPERATURE	0.8	PROBE HEATER SETTING	•	О2/СО2 МЕТНОВ	Frite	
BAROMETRIC PRESSURE	29.81	HEATER BOX SETTING	١	. 70	°65,	
STATIC PRESSURE (Pe)	0,005			200	9%	4
INITIAL LEAKCHECK	6.000 6 We	1/4°		FINAL LEAKCHECK	0.005 C 65/16	5.5%
			•			\

READ AND RECORD ALL DATA EVERY 2.5 MINUTES

Traverse	Sempling	Clock	Gas Meter	Velocity	9	Ortifice	\		Temperature (*F)		
Point	Time	- II	Reading	Peof	986	- Preseure	E E	Dry Gae Meter	. Motor		Pump
Number	(mim)	(24-hr)	(Vm), cu.R		Temperature	Differential	Temperature	Inlet	Order	Impinger	Vacuum
	Cent	9491	49.849	/ In. H20	(•F)	(• H, In. H2O)	/ (۳۶	(Tm in)	(Tm out)	Exit	(ja. Hg)
-	7	7.649.	645.3		120	08.	\	85	58	22	4
	3	247/	8111		/20	08.		28	98	75	7
	7 7	> th 7/	0.879		170	Ολ.		2/8	88	67	را
†	o/	05 %	649,2		120	08.		86	38	\\ \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot \cdot \cdot \\ \cdot	7
	13 <) (3 //	\		/20	08.		86	252	6 8	۲
	> 1	777	1137		120	0%.		87	86	20	4
	700	763//	9,537		/20	27		87	36	99	4
	14:2	1200	ナマンツ		120	0%.		18	86	63	2
	2000	7.7071	6431		1 20	03		28	S	63	2
	2,75	1200	1 100		200	03.		ナン	58	6.2	2
	75.	1201	1,0216		-	3.		ري د د	25	ر د	2
	44.2	1701-2	4750		3.	2 4		100	,	/ /	2
	ጷ	1710	658.632		07)	. &C		XX	34	8	
1. (")	65		269 71 1		130	080			86.0		



METHOD 5 FIELD DATA

RUN 3

PLANT	Thermotrix	LEY MATTIX PROBE LENGTH AND TYPE 14"//Effet HEIGHT OF LOCATION (N)	14"/Teflow	HEIGHT OF LOCATION (R)	31
DATE	51/2/0)	NOZZLE I.D. (In)	,	DUCT DIMENSIONS	1.51
SAMPLING LOCATION	OST(ST	METER BOX NUMBER	SAC-01	AC-01 FILTER NUMBER	ľ
SAMPLE TYPE	HCL	METER . H®	1.894	ASSUMED MOISTURE (%)	L
RUN NUMBER	~	ρλ	861.0	O.74 & MOISTURE METHOD	impinger gan
OPERATOR	107/JWS	TE/LOL KFACTOR		MOISTURE DATA	At a me
AMBIENT TEMPERATURE	800	PROBE HEATER BETTING		O2/CO2 METHOD	Fynie
BAROMETRIC PRESSURE	129.61	HEATER BOX SETTING	١	20	9.6
STATIC PRESSURE (Pe)	0.005			203	8%
INITIAL LEAKCHECK	1),005 C 7 /h			FINAL LEAKCHECK	0.005061149
		_	•		

READ AND RECORD ALL DATA EVERY MINUTES

	Neading (Vm), cu. R (58,700 (659.90)	Ĭ.	8						
(min) 0 1 2.5 1 2.5 1 2.5 1 1.5 1 1.5 1 2.0 2.0 2.2 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5		<u>(</u>		- Preseure	Fillo	Dry Gae Meter	Meter		Pump
			Temperature	7	Température	Files	Outlet	†mplnger	Vacuum
		, H20	(•F)	(+ H, in. H2O)	(·n	(Tm ln)	(Tm out)	Ext	(In. Hg)
	\Box	,,,,,	441	08.0		58	56	7.8	へ
	C62		121	08.0		58	83	74	٨
	L		77/	08:0		48	83	70	٨
			727	08.0	,	3	\$ \$	99	7
	6.4.9		721	08.0		85	84	の子	ત્ડ
	6.66.3		127	0.80		28	84	c C	~
			221	08.0		5.8	84	67	۲
3	69.3		721	08.0		98	53	67	4
			271	080		86	88	37	7
L	_		しなみ!	08.0		-5 B	48	67	ح
27.5% (75.7.5	672.4		441	08'0		85	2.5	67	4
	6 73.394		122	05.0		86	27%	89	2
1 (1) of	14 696		122	08.0			24.7		

Velocity Traverse Data Sheet

ALMT	Mcclellan	
DATE	10/6/95	
LOCATION _	Thermatrix	
STACE I.D.		
MACHETRIC	PRESSURE IL M	9.81
STACE GAUG	E PRESSURE, a. N-0	
OPERATORS	SAE I L	-DC

SCHEMATIC OF TRAVERSE POINT LAYOUT

_			
<i>3</i> 0	TRAVERSE POINT NUMBER	VELOCITY HEAD Way I, HI NO	STACK TEMPERATURE (T _s), "F
n [0.01	120
† <i>Q.0</i> 3[ಎ	1001	
وعدم ر	3	0.01	
-		1 to = 0.1	
			1220
) 2	1	0.01	1220
1	<u>ス</u> 3	0.0015	
.005		1 0.01	<u> </u>
		TE =0.0959	l
	1	00075	1 1202
	2	0.0015	7,000
05	3	1 0.01	
		150:0.0911	
105			
		1	
		1	
	-		1
		1	
	Audinos	!	
	AVERAGE	1	1

TRAVEISE POINT RUBBER	METOCILA METO METOCILA	STACK TEMPERATURE (Tg), °F
		;
		!
	1	<u>i</u>
		İ
AVERAGE		

MOISTURE RECOVERY FORM FOR METHOD 4

Plant	maci in
Date	McClellan 9-23-95
Sampling Location	Thermatr X
Sample Type	1 CI
Run Number	:
Sample Box Number	
Clean-up Person	LDL.
Solverit Rinses	cernanate soln
Sample Identification Code	Therm - 01
XAD Trap Number	The contract of

Impinger	Impiana	Amount of		lm	pinger Weigi	ht (g)
Number	Impinger Solution	Solution (g)	Impinger Tip Configuration	Final	Initial	Weight Gain
1	too Carbl bicerb suh	100 ml	MGS	125	100	25
2	b.carbl Carbo soin	100 ml	65	ilo	100	10
3	Empty	100 —	mes	0.0	0.0 1000	0
4	silico- Gel	~200g	MGS	716.3	707.9	8.4
5	·	` .				
6						
7						

TOTAL WEIGHT GAIN (g)

43.4

Note. Strong HCL Smell from sampling

MOISTURE RECOVERY FORM FOR METHOD 4

Plant	McCkilan
Date	9-22-95
Sampling Location	Thermati.x
Sample Type	HCL
Run Number	2
Sample Box Number	_
Clean-up Person	LDL
Solvent Rinses	Campat solo
Sample Identification Code	Therm -02
XAD Trap Number	

		Amount of		· Im	pinger Weigh	nt (g)
Impinger Number	Impinger Solution	Solution (g)	Impinger Tip Configuration	Final	Initial	Weight Gain
1	Carbenale	100m1	MGS	130	100	30
2	↓	100ml	GS	112ml	100	12
3	Empty	0~1	MGS	Oml	Oml	0
4	Silica Gel	~200g	MGS	665.1	658.3	6.8
5	·		•			
6		-				
7						

TOTAL WEIGHT GAIN (g)

48.8

Plant	McCicilan
Date	9-22-95
Sampling Location	Thermatrix
Sample Type	HCI
Run Number	3
Sample Box Number	
Clean-up Person	LDL
Selvent Rinses	carbonate Soln
Sample Identification Code	Therm-03
XAD Trap Number	

		Amount of		Imp	inger Weight	(g)
Impinger Number	Impinger Solution	Solution (g)	Impinger Tip Configuration	Final	Initial	Weight Gain
1	bicarbl curbocke solo	100 ml	mes	136	100	36
2			G5	108	100	8
3	Empty	0	m 65 .	2	0	٦
4	Silico-	~200g	mes	664.4	6573	7.1
5						
6						
7						

	McClellan
Plant	Thermaterx
Date	10-6-95
Sampling Location	Thermatrix
Sample Type	HCL
Run Number	
Sample Box Number	-
Clean-up Person	LDL
Solvent Rinses	1-1-
Sample Identification Code	Therm-5
XAD Trap Number	

		Amount of		lmg	inger Weight	(e) m1
Impinger Number	Impinger Solution	Solution (9) m /	Impinger Tip Configuration	Final	Initial	Weight Gain
1	bicarbl corb	locml	mes	111	IDDml	11
2			ĠS	105	100 m1	5_
3	Empty	0	mes .	0	Oml	0
4	Silica Gel	~200g	me-s	654.90	647.90	7
5	GO.			•		
6						
7						

Plant	McClellan
Date	10-6-95
Sampling Location	Thermatrix
Sample Type	HCI
Run Number	2
Sample Box Number	
Clean-up Person	LDL
Solvent Rinses	
Sample Identification Code	Therm-6
XAD Trap Number	

		Amount of		lmp	inger Weight	(g)
Impinger Number	Impinger Solution	Solution (g)	Impinger Tip Configuration	Final	Initial	Weight Gain
1	bicarbl carb soin	100ml	mes	118	100	18
2			G S	104	100	4
3	Empty	0	mes.	0	6	0
4	Silica	~2003	mes	632.92	628.46	4.46
5						
6						
7						

McClellan
10-6-95
Thermatrix
HCI
3
LDL
Therm-7

		Amount of		!mp	inger Weight	(0)
Impinger Number	Impinger Solution	Solution (g)	Impinger Tip Configuration	Final	initial	Weight Gain
1	b,carb/ carb suln	100ml	mes	116	100	16
2	1		GS	104	100	4
3	Empty	0	m65.	0	0	
4	Silica Gel	~200g	mes	605.04	600.20	4.24
5						
6						
7						

ATTACHMENT B LABORATORY DATA AND CHAIN-OF-CUSTODY FORMS

Sample Identification Legend

The samples are identified as follows:

THERM-01: Test 1 (9/22/95)

THERM-02: Test 2 (9/22/95)

THERM-03: Test 3 (9/22/95)

THERM-04: Field Blank (9/22/95)

THERM-5: Test 1 (10/06/95)

THERM-6: Test 2 (10/06/95)

THERM-7: Test 3 (10/06/95)

THERM-8: Field Blank (10/06/95)

THERM-RB: Reagent Blank

ANALYTICAL RESULTS

FLAG DEFINITIONS

)	DETINITION
, DI.	Result less than stated Detection Limit and greater than or equal to zero. Analyte concentration not available for this analysis.
NC	
Q	Not detected. No instrument response for analyte or result less than zero.
¥	Not reported. Result greater than or equal to stated Detection Limit and less than specified Reporting Limit.
NS	Analyte not spiked.
60	Analyte detected in method blank at concentration greater than the Reporting Limit (and greater than zero).
ပ	Confirming data obtained using second GC column or GCMS.
ш	Analyte concentration exceeded calibration range.
<u>L</u>	Interference or coelution suspected. See Narrative for explanation.
Ξ	Presence of analyte previously confirmed by historical data.
-	Analyte identification suspect. See Narrative for explanation.
7	Result is less than stated Detection Limit but greater than or equal to specified Reporting Limit.
×	Peak did not meet method identification criteria. Analyte not detected on other GC column.
×	Result modified from previous Report. See Narrative for explanation.
۵.	Analyte not confirmed. Results from primary and secondary GC columns differ by greater than a factor of 3.
o	QC result does not meet tolerance in Protocol Specification.
æ	Result reported elsewhere.
S	Analyte concentration obtained using Method of Standard Additions (MSA).
J	Second column confirmational analysis not performed.
×	See Narrative for explanation.
>	See Narrative for explanation.
7	See Narrative for explanation.

Method <u>Chloride, by CARB 421</u> Test Code <u>CLIEWA00</u>

Project Sample ID:	THERM-01		THERM-02	02	THERM-03)3	THERM-03	
Lab ID:	9509449-01A		9509449-02A	02A	9509449-03A	13A	9509449-06A DUP	DUP
File ID:	ICXC0926-40		ICXC0926-41	-41	1CXC0926-42	25	1cxc0926-43	43
Date Collected:	09/22/95		09/22/95	95	09/22/95	ñ	09/22/95	2
Date Prepared:			-	*				ı
Date Analyzed:	09/26/95 11:45:00	5:00	09/26/95 11:45:00	1:45:00	09/26/95 11:45:00	:45:00	09/26/95 11:45:00	:45:00
Dilution Factor:	2000		2000		2000		2000	•
Matrix:	Water		Water		Water		Water	
Units:	ng/sample	-	ng/samble	e.	ng/samble	ø.	ng/sample	ø
Report as:	received		received	70	received	ס	received	סי
column:								
Analyte	Conc.	סו	Conc.	10	Conc.	10	Conc.	DL
Chloride	2710000	22500	2970000	21900	3,090,000	20200	3060000	20200

Method <u>Chloride, by CARB 421</u> Test Code <u>CLIEMADO</u>

9509449-04A 9509449-05A 1CXC0926-47 1CXC0926-47 09/22/95 09/22/95 09/22/95 09/22/95 11:45:00 09/26/95	Project Sample ID:	THERM-04	THERM-RB				
1CXC0926-46 1CXC0926-47 09/22/95 09/22/95 09/26/95 11:45:00 09/26/95 11:45:0 1 1 1 1 Water ug/sample ug/sample received received Conc. DL Conc. E	Lab ID:	9509449-04A	9509449-05A		. •		
09/22/95 09/22/95 09/26/95 11:45:00 09/26/95 11:45:00 09/26/95 11:45:00 09/26/95 11:45:00	File ID:	ICXC0926-46	ICXC0926-47				
09/26/95 11:45:00 09/26/95 11:45:0 Water Water Ug/sample received received Conc. DL Conc.	Date Collected:	09/22/95	09/22/95				
09/26/95 11:45:00 09/26/95 11:45:0 1	Date Prepared:		********				
1	Date Analyzed:	09/26/95 11:45:00	09/26/95 11:45:00				
Water Water ug/sample ug/sample received received Conc. DL Conc. E	Dilution Factor:	-	-				
ug/sample ug/sample as: received received Conc. DL Conc. [Matrix:	Water	Water				
conc. DL Conc. E	Units:	ug/sample	aldwes/Sn				
Conc. DL Conc. C	Report as:	received	received				
Conc. DL Conc. [Column:		****				
ON 65°2 ON	Analyte			Conc.	10	Conc.	DT
	Chloride	ND 7.49	ND 12.7	·			

10/30/95 13:36:10

Method <u>Chloride, by CARB 421</u> Test Code <u>CLIEWAOO</u>

Project Sample ID:	THERM-5		THERM-6		THERM-6		THERM-7	
tab ID:	9510302-01A		9510302-02A	SA.	9510302-03A DUP	DUP	9510302-04A	ķ ,
File ID:	ICXC1016-12		ICXC1016-15	15	ICXC1016-16	91	ICXC1016-17	21
Date Collected:	10/06/95	-	10/06/95	5	10/06/95	10	10/06/95	0
Date Prepared:								
Date Analyzed:	10/16/95 15:00:00		10/16/95 15:00:00	:00:00	10/16/95 15:00:00	00:00	10/16/95 15:00:00	00:00
Dilution Factor:	1000		1000		1000		1000	
Matrix:	Water		Water		Water		Water	
Units:	ng/sample		ng/sample	Ð	ug/sample	4	ud/samble	A 1
Report as:	received	_	received	סד	received		received	
Column:								
Analyte	Conc. DL		Conc.	DF	Conc.	DL	Conc.	DF
Chloride	968000	28.8	1070000	28.8	1110000	28.8	1370000	28.8

421	
CARB	
ă	90
Chloride	CL I EWA00
~	Code
Methoc	Test

Project Sample ID:	THERM-8		THERM-RB	88	THERM-RB	æ			
Lab ID;	9510302-05/	 24	9510302-06A	P9(9510302-06A	16A			
File ID:	ICXC1016-18	18	ICXC1016-11	-11	ICXC1016-20	.20			
Date Collected:	10/06/95	2	10/06/95	35	10/06/95	5.			
Date Prepared:				-					
Date Analyzed:	10/16/95 15:0	:00:00	10/16/95 15:00:00	5:00:00	10/16/95 15:00:00	00:00:			
Difution Factor:			•		-				
Matrix:	Water		Water		Water				
Units:	ng/sample	G D	ng/sample	le le	ng/samble	ø,			
Report as:	received	77	received	72	received	72			
Column:									
Analyte	Conc.	DI	Conc.	占	Conc.	٥٢	Conc.	ы	
Chloride	QN	0.0288	QN	0.0288	QN	0.0288			

SUPPORTING ANALYTICAL DATA (9/22/95 SAMPLES)

RADIAN ANALYTICAL SERVICES FOR THE FOR SERVICES

TABLE OF CONTENTS

Client THERMATRIX

Facility MCCLELLAN AFB Client Code IHERMATRIX

Certified By Airla Cicle.
Date 9/28/95

		Paç	Pages
Report Form	Analytical Batch ID	From	To
Work Order Summary		1	
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Protocol Summary for Chloride, by IC EPA300		4	4
Results Summary		2	9
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Laboratory Control Samples		15	15
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Sample Duplicates		82	20
Comments/Narrative		21	77

09/28/95 14:17:41

WORK ORDER SUMMARY

Client Code IHERMATRIX

Report LISA LAFE

TO 10389 OLD PLACERVILLE ROAD

SACRAMENTO, CA 95827

Attention LISA LAFE

Phone (916) 362-5332

Prepared Radian Analytical Services

By 14046 Summit Dr., Bldg. B

P. 0. Box 201088

Austin, 1X 78720-1088

512/244-0855

CSC JGSANDOVAL

Case # NA SDG # NA RAS # 50912AJGS

Work ID THERMATRIX TREATABIL

Client THERMATRIX
Facility MCCLELLAN AFB

Work Order # 9509449

RCN 269-104-18-02

Project Sample ID/ Description	HERM-01	THERM-02	THERM-03	HERM-04	HERM-RB	HERM-03		
Lab Sample ID	01A	02A	03A	04A	05A	06A DUP	07A MS	OBA MSD
Test Code(s)	CLI EVA00	CLI EWA00						
Method Desciption	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300	Chloride, by IC EPA300

Volume (mls)	390	380	350	260	740
Sample	9509449-01A	9509449-02A	9509449-03A	9509449-04A	9509449-05A

ANALYTICAL PROTOCOL SUNMARY

Page 4 Work Order # 9509449

Client THERMATRIX

Specification # XXIE

Facility MCCLELLAN AFB
Client Code THERMATRIX
Method Chloride, by IC EPA300

Project Sample ID/Description	Lab Sample ID	Test Code(s)	Extraction/Digestion Batch #	Analysis Batch #
THERM-01 THERM-02 THERM-03 THERM-04 THERM-RB	9509449-01A 9509449-02A 9509449-03A 9509449-06A 9509449-05A	CLIEWADD CLIEWADD CLIEWADD CLIEWADD CLIEWADD CLIEWADD CLIEWADD	A A A A A	WLICXC50926114502 WLICXC50926114502 WLICXC50926114502 WLICXC50926114502 WLICXC50926114502

Method Chloride, by IC EPA300

Initial Calibration # NA Test Code CLIEWADO

Calibration Date

Analysis Batch # WLICXC50926114502 ANALYSIS BATCH SUMMARY

Work Order # 9509449

Page 7

Analysis Start Date/Time <u>09/26/95 11:45:00</u> Analysis Stop Date/Time <u>09/26/95 22:15:00</u>

Instrument ICXC Reviewer TDK Analyst MD

Sequence/Analysis Time	Project Sample ID	Lab Sample ID	Sample Type	Analysis File #
1 09/26/95 11:45:00		autocallr	Initial Calibration	ICXC0926-1
2 09/26/95 11:45:00		autoca12r	Initial Calibration	ICXC0926-2
3 09/26/95 11:45:00		autocal3r	Initial Calibration	ICXC0926-3
4 09/26/95 11:45:00		autocal4r	Initial Calibration	1CXC0926-4
5 09/26/95 11:45:00		autocal5r	Initial Calibration	ICXC0926-5
6 09/26/95 11:45:00		autocal6r	Initial Calibration	1CXC0926-6
7 09/26/95 11:45:00		ICV	Continuing Calibration Check	1cxc0926-7
35 09/26/95 11:45:00		ccv	Continuing Calibration Check	1CXC0926-35
36 09/26/95 11:45:00	Maria	BLK953935	Laboratory Blank	1CXC0926-36
37 09/26/95 11:45:00		LCS955878	Lab Control Sample	ICXC0926-37
38 09/26/95 11:45:00		LCSD95878	Lab Control Sample Dup	1cxc0926-38
39 09/26/95 11:45:00		A950944901A	Sample	ICXC0926-39
40 09/26/95 11:45:00	THERM-01	9509449-01A	Sample	ICXC0926-40
41 09/26/95 11:45:00	THERM-02	9509449-02A	Sample	ICXC0926-41
42 09/26/95 11:45:00	THERM-03	9509449-03A	Sample	ICXC0926-42
43 09/26/95 11:45:00	THERM-03	9509449-06A	Sample Dup	ICXC0926-43
44 09/26/95 11:45:00	THERM-03	9509449-07A	Matrix Spike	ICXC0926-44
45 09/26/95 11:45:00	THERM-03	9509449-08A	Matrix Spike Dup	1CXC0926-45
46 09/26/95 11:45:00	THERM-04	9509449-04A	Sample	1CXC0926-46
47 09/26/95 11:45:00	THERM-RB	9509449-05A	. aldwes	ICXC0926-47
48 09/26/95 11:45:00		ccv	Continuing Calibration Check	1CXC0926-48

RESULTS

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Work Order # 9509449

Digestion Batch # WLICXC50926114502

Date Collected <u>09/22/95</u>

Date Received <u>09/23/95</u>

Project Sample ID THERM-01 Lab Sample ID 9509449-01A

Instrument ICXC

Reporting Subset _____Spikes Subset ____

Matrix W Report As received

File # ICXC0926-40 Wethod Chloride, by CARB 421 Test Code CLIEWA00	Date Prepared Date Analyzed 09/26/95 11:45:00	Analyst MD 5 11:45:00 Reviewer TDK	Spikes SubsetSpecs Subset	Report As <u>rec</u>
		Aliquot Mass/Volume 1 (mL) Extract/Digestate Volume 390 (mL) Dilution Factor 2000		
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	2710000	22500	22500

RESULTS

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Work Order # 9509449

Digestion Batch #

Analysis Batch # WLICXC50926114502

Method Chloride, by CARB 421 Project Sample ID THERM-02 Lab Sample ID 9509449-02A File # ICXC0926-41 Test Code CLIEWA00

Reviewer IDK Date Analyzed 09/26/95 11:45:00 Date Collected 09/22/95 Date Received 09/23/95 Date Prepared

Instrument ICXC Analyst MD Column

Matrix W Report As <u>received</u> % Moisture Reporting Subset Spikes Subset Specs Subset

		Aliquot Mass/Volume 1 (mL) Extract/Digestate Volume 380 (mL) Dilution Factor 2000		
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	2970000	21900	21900

Digestion Batch #

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Work Order # 9509449

Analysis Batch # WLICXC50926114502

Date Collected 09/22/95

Instrument ICXC

Reporting Subset

Report As received Reporting Limit ug/sample % Moisture Matrix W 20200 Spikes Subset Specs Subset ____ Detection Limit ug/samble 20200 Extract/Digestate Volume 2000 Measured Concentration Reviewer 10K Aliquot Mass/Volume Analyst MD Column ug/sample 1 (mL) Dilution Factor _ 350 (mL) 3090000 Date Analyzed 09/26/95 11:45:00 Date Received 09/23/95 Date Prepared CAS # NO_CAS Method Chloride, by CARB 421 Project Sample ID THERM-03 Lab Sample ID 9509449-03A File # ICXC0926-42 Test Code CLIEWA00 Analyte Chloride

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Work Order # 9509449

Analysis Batch # WLICXC50926114502 Digestion Batch #

Instrument ICXC Reviewer TDK Analyst MD Column 09/26/95 11:45:00 Date Collected 09/22/95 Date Received 09/23/95 Date Analyzed Date Prepared Method Chloride, by CARB 421 Project Sample ID THERM-04 Lab Sample ID 9509449-04A File # ICXC0926-46 Test Code CLIEWA00

Matrix W Report As received % Moisture Reporting Subset Spikes Subset Specs Subset

		Aliquot Mass/Volume		
	- 100	Extract/Digestate Volume 260 (mL)		
		Dilution Factor 1		
Analyte	CAS **	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	QN	67.7	7.49

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Work Order # 9509449

Analysis Batch # WLICXC50926114502 Digestion Batch #

Instrument ICXC Analyst MD Reviewer TOK Column Date Analyzed 09/26/95 11:45:00 Date Collected 09/22/95 Date Received 09/23/95 Date Prepared Method Chloride, by CARB 421 Project Sample ID THERM-RB Lab Sample ID 9509449-05A

File # ICXC0926-47

Test Code CLIEWA00

Matrix W Report As received % Moisture Reporting Subset Spikes Subset Specs Subset ____

		Aliquot Mass/Volume		
		Extract/Digestate Volume		
		Dilution Factor 1		
		Measured Concentration	Detection Limit	Reporting Limit
Analyte	CAS #	ng/sample	ug/sample	ng/sample
Chloride	NO_CAS	QN	12.7	12.7

Digestion Batch #

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Work Order # 9509449

Analysis Batch # WLICXC50926114502

Instrument ICXC Analyst MD Reviewer TDK Column Date Analyzed 09/26/95 11:45:00 Date Collected 09/22/95 Date Received 09/23/95 Date Prepared tab Sample ID 9509449-06A DUP File # ICXC0926-43
Method Chloride, by CARB 421 Project Sample ID THERM-03 Test Code CLIEWA00

	received	ď
31	As	ī
Matrix	Report As	% Moisture
Reporting Subset	Spikes Subset	Specs Subset
- 1		

		Aliquot Mass/Volume 1 (mL) Extract/Digestate Volume 350 (mL) Dilution Factor 2000		
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	3060000	20200	20200

LABORATORY BLANK INFORMATION

Work Order # 9509449 Page 14

> Analysis Batch # WLICXC50926114502 Digestion Batch #

Lab Sample ID BLK953935

Date Prepared 09/26/95 11:45:00

Method Chloride, by CARB 421

File # ICXC0926-36

Instrument ICXC

Spikes Subset Reporting Subset

Matrix 💆

Column Analyst MD Reviewer TDK

Specs Subset

Reporting Limit 0.0288 Detection Limit 0.0288 mg/L Extract/Digestate Volume Aliquot Mass/Volume Measured Conc. J (m) 1 (mL) Dilution Factor _ mg/L Ş Analyte Chloride Test Code CLIEWADO

CONTROL SAMPLE LABORATORY

Work Order # 9509449 Page 15

Digestion Batch # MLICXC50926114502

,			
(mL)		Spec. Limit %	2
	RPD	Spec. Result Limit	3.0
ceived or vol	Recovery Spec. Limits	High %	110
Hass Leass	Reco Sp Lim	K NON	06
Matrix Wareport As received Wasture Aliquot Mass or Vol Extract Mass or Vol		Rec.	100
	LCS Duplicate Lab Sample ID LCSD95878 File ID ICXC0926-38	Measured Conc. mg/L	8.01
Reporting Subset Spikes Subset Specs Subset	Li File II	Spiked Conc. mg/L	8.00
Re		Rec.	103
Instrument <u>ICXC</u> Column Analyst <u>MD</u> Reviewer <u>IDK</u>	LCS Lab Sample ID <u>LCS955878</u> File ID <u>ICXC0926-37</u>	Measured Conc. mg/t	8.26
-	La 1 File IC	Spiked Conc. mg/L	8.00
Date Analyzed 09/26/95 11:45:00	Vol. Added Surrogate Sol'n # Vol. Added		
Method <u>Chloride, by CARB 421</u> Test Code <u>CLIEWAOO</u>	Control Std. # Vol. Added B30849P87	Analyte	Chloride

MATRIX SPIKE(S)

Digestion Batch #

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Work Order # 9509449

Analysis Batch # WLICXC50926114502

% Moisture Specs Subset Spikes Subset Reporting Subset Instrument ICXC Reviewer IDK Analyst MD Column Date Analyzed 09/26/95 11:45:00 Date Collected 09/22/95 Date Received 09/23/95 Date Prepared Method Chloride, by CARB 421 Project Sample ID THERM-03 Test Code CLIEWA00

Matrix W Report As received

Spike Sol'n # Vol. Added 830849P86 200 uL Surrogate Sol'n Vol. Added	יוו פון צ	Sample Lab Sample ID 9509449-03A File # ICXC0926-42 Aliquot Mass/Vol 1 (mL) Extract Mass/Vol 350 (mL) Dil Fact. 2000	File St. Per Per Per Per Per Per Per Per Per Per	Spiked Sample Lab Sample ID 9509449-07A MS File # ICXC0926-44 Aliquot Mass/vol 10 (mL) Extract Mass/vol 350 (mL) Dil Fact. 2000		Fite	Spiked Sample Dup Lab Sample ID 9509449-08A MSD File # ICXC0926-45 Aliquot Mass/Vol 10 (mL) Extract Mass/Vol 350 (mL) Dil Fact. 2000		Recovery Specifi- cation Limits	er fi	RPO	Q
Analyte	Spike Sol'n Conc. mg/L	Measured Conc. ug/sampl	Spiked Conc. ug/sampl	Measured Conc. ug/sampl	% ec.	Spiked Conc. ug/sampl	Measured Conc. ug/sampl	Rec.	¥ ×	tigh R	Low High Result	Specifi- cation Limit
Chloride	200	3090000	2800000	2800000 5670000	92 0	92 a 2800000	5550000	88 Q 95	28	105	4.4	15

VERIFICATION

Analysis Batch # WLICXC50926114502

Initial Calibration # NA

Reporting Subset Spikes Subset ____ Specs Subset

Date Analyzed 09/26/95 11:45:00

Instrument ICXC Analyst MD

> Method Chloride, by CARB 421 Test Code CLIEWA00

File # ICXC0926-48 Lab Sample ID CCV

110 High % Specification Limits Recovery ¥ € 8 Recovery 9 Concentration Reference mg/L 6.00 Concentration Measured 5.98 mg/L Analyte Chloride

Reviewer TDK

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Work Order # 9509449

VERIFICATION

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Work Order # 9509449

Analysis Batch # WLICXC50926114501

Initial Calibration # NA

Date Analyzed 09/26/95 11:45:00

Reporting Subset Spikes Subset

Instrument ICXC Reviewer TDK Analyst MD

Test Code CLIEWA00

Lab Sample ID CCV

High * Specification Limits Recovery ₹ × Specs Subset Recovery Concentration Reference mg/t 9.00 Concentration Measured 6.00 mg/L Method Chloride, by IC EPA300 Analyte File # ICXC0926-35

110

8

100

Chloride

VERIFICATION

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Work Order # 9509449

Analysis Batch # WLICXC50926114500 Initial Calibration # NA

Date Analyzed 09/26/95 11:45:00 Lab Sample ID ICV File # ICXC0926-7

Reporting Subset ____ Spikes Subset ____ Specs Subset

Instrument ICXC Analyst MD Reviewer IDK

Method Chloride, by IC EPA300 Test Code CLIEWADO

Recovery Specification Limits	High *	110
Recovery Specificati Limits	LOW	90
	Recovery %	100
	Concentration mg/L	90.9
	Measured Concentration mg/L	5.99
	Analyte	Chloride

SAMPLE DUPLICATES

Work Order # 9509449 Page 20

Digestion Batch #
Analysis Batch # WLICXC50926114502

received	
Matrix W Report As	
Reporting Subset Spikes Subset Specs Subset	RPO
CXC	Sample Duplicate Lab Sample ID Lab Sample ID 9509449-03A 9509449-06A DUP Dil Fact. 2000 Dil Fact. 2000
11:45:00	Sample Lab Sample ID 9509449-03A Dil Fact. 2000
Date Collected 09/22/95 Date Received 09/23/95 Date Prepared Date Analyzed 09/26/95 11:45:00	
Project Sample ID THERM-03 Method Chloride, by CARB 421 Test Code CLIEWA00	

Specification Limit

Measured

Measured

Conc.

Analyte

Chloride

Conc.

ng/samble

ug/sample

Result

23

1.0

3060000

3090000

SUPPORTING ANALYTICAL DATA (10/6/95 SAMPLES)

10/30/95 13:36:10

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Client THERMATRIX

Facility MCCLELLAN AFB Client Code THERMATRIX

Certified By June Gate

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WORK ORDER SUMMARY

Report LISA LAFE

TO 10389 OLD PLACERVILLE ROAD

SACRAMENTO, CA 95827

Attention LISA LAFE

Phone (916) 362-5332

Prepared Radian Analytical Services

By 14046 Summit Dr., Bldg. B

P. 0. Box 201088

Austin, TX 78720-1088

512/244-0855

CSC JGSANDOVAL

Client Code THERMATRIX
Client THERMATRIX
Facility MCCLELLAN AFB
Work ID THERMATRIX TREATABIL

Page

Work Order # 9510302

RCN 269-104-18-02

NA	NA	50912AJGS
**	*	*
Case	* DOS	RAS #
ပ္ပ	SD	≨

Description	Lab Sample ID	Test Code(s)	Method Desciption
THERM-5	01A	CL I EWA00	Chloride by IC
THERM-6	02A	CLIEWA00	Chloride by IC
	03A DUP	CL I EWA00	Chloride by IC
THERM-7	04A	CLI EWA00	Chloride by IC
THERM-8	05A	CLIEWA00	Chloride by IC
THERM-RB	06A	CLI EWA00	Chloride by IC
THERM-5	07A MS	CLI EWA00	Chloride by IC
	OSA MSD	CLI EWA00	Chloride by IC

ANALYTICAL PROTOCOL SUMMARY

Work Order # 9510302

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Client THERMATRIX

Specification # CLIE

Facility MCCLELLAN AFB

Client Code THERMATRIX

Method Chloride by IC

Project Sample ID/Description	Lab Sample ID	Test Code(s)	Extraction/Digestion Batch #	Analysis Batch #
THERM-5	9510302-01A	CLI EWA00	NA	WLICXC51016150001
THERM-6	9510302-02A	CLI EWA00	NA NA	WLICXC51016150001
THERM-6	9510302-03A	CL I EWA00	NA	WLICXC51016150001
THERM-7	9510302-04A	CLI EWA00	NA	WLICXC51016150001
THERM-8	9510302-05A	CL I EWA00	NA	WLICXC51016150001
THERM-RB	9510302-06A	CL1EWA00	NA	WLICXC51016150001
THERM-RB	9510302-06A	CLI EWA00	NA NA	WLICXC51016150001

Initial Calibration # NA

Calibration Date

Method Chloride by IC Test Code CLIEWA00

Analysis Batch # WLICXC51016150001 ANALYSIS BATCH SUMMARY

Analysis Start Date/Time 10/16/95 15:00:00 Analysis Stop Date/Time 10/16/95 20:00:00

Instrument ICXC Reviewer IDK Analyst MH

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1 10/16/95 15:00:00						
10/16/95 15:00:00 autocalTr Initial Calibration 10/16/95 15:00:00 10/16/95 15:00:00 Initial Calibration Check 10/16/95 15:00:00 IHERN-S 9510302-06A Sample 10/16/95 15:00:00 IHERN-S 9510302-07A Matrix Spike 10/16/95 15:00:00 IHERN-F 9510302-03A Sample 10/16/95 15:00:00 IHERN-F 9510302-03A Sample 10/16/95 15:00:00 IHERN-F 9510302-05A Sample	Sequenc	e/Analysis Time	Project Sample ID	Lab Sample ID	Sample Type	Analysis File #
10/16/95 15:00:00 Initial Calibration autocal2r Initial Calibration autocal3r Initial Calibration autocal4r Initial Calibration autocal4r Initial Calibration autocal4r Initial Calibration autocal6r Initial Calibration Check autocal6r	1 10/16	/95 15:00:00		autocallr	Initial Calibration	ICXC1016-1
10/16/95 15:00:00 autocad3r Initial Calibration autocal4r 10/16/95 15:00:00 10/16/95 15:00:00 Initial Calibration autocal5r Initial Calibration autocal6r 10/16/95 15:00:00 10/16/95 15:00:00 Initial Calibration autocal6r Initial Calibration autocal6r 10/16/95 15:00:00 1CV Continuing Calibration Check BLK954402 Laboratory Blank LCS956982 10/16/95 15:00:00 1HERN-RR 1CS956982 Lab Control Sample Dup Sample Dup Sample 10/16/95 15:00:00 1HERN-S 9510302-04A Sample Dup Sample Dup Sample Dup Sample Dup Sample 10/16/95 15:00:00 1HERN-G 9510302-03A Sample Dup Sample Dup Sample Dup Sample 10/16/95 15:00:00 1HERN-G 9510302-03A Sample Dup Sample 10/16/95 15:00:00 1HERN-G 9510302-03A Sample Dup Sample 10/16/95 15:00:00 1HERN-G 9510302-03A Sample Dup Sample 10/16/95 15:00:00 1HERN-G 9510302-03A Sample Dup Sample 10/16/95 15:00:00 1HERN-R 9510302-03A Sample Sample 10/16/95 15:00:00 1HERN-R 9510302-05A Sample Sample <t< td=""><td>2 10/16</td><td>/95 15:00:00</td><td></td><td>autocal2r</td><td>Initial Calibration</td><td>ICXC1016-2</td></t<>	2 10/16	/95 15:00:00		autocal2r	Initial Calibration	ICXC1016-2
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10/16/95 15:00:00 THERM-RB LCSD956982 Lab Control Sample Dup 10/16/95 15:00:00 THERM-S 9510302-06A Sample 10/16/95 15:00:00 THERM-5 9510302-01A Sample 10/16/95 15:00:00 THERM-5 9510302-07A Matrix Spike 10/16/95 15:00:00 THERM-5 9510302-02A Sample 10/16/95 15:00:00 THERM-6 9510302-03A Sample 10/16/95 15:00:00 THERM-7 9510302-03A Sample 10/16/95 15:00:00 THERM-8 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample	9 10/16,	/95 15:00:00		103956982	Lab Control Sample	ICXC1016-9
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10/16/95 15:00:00 THERM-5 9510302-07A Matrix Spike 10/16/95 15:00:00 THERM-5 9510302-08A Matrix Spike Dup 10/16/95 15:00:00 THERM-6 9510302-02A Sample 10/16/95 15:00:00 THERM-7 9510302-04A Sample 10/16/95 15:00:00 THERM-8 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample	12 10/16,	/95 15:00:00	THERM-5	9510302-01A	Sample	ICXC1016-12
10/16/95 15:00:00 THERM-5 9510302-08A Matrix Spike Dup 10/16/95 15:00:00 THERM-6 9510302-02A Sample 10/16/95 15:00:00 THERM-7 9510302-03A Sample Dup 10/16/95 15:00:00 THERM-8 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-06A Sample	13 10/16,	/95 15:00:00	THERM-5	9510302-07A	Matrix Spike	ICXC1016-13
10/16/95 15:00:00 THERM-6 9510302-02A Sample 10/16/95 15:00:00 THERM-7 9510302-03A Sample Dup 10/16/95 15:00:00 THERM-7 9510302-04A Sample 10/16/95 15:00:00 THERM-8 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-05A Sample 10/16/95 15:00:00 THERM-RB 9510302-06A Sample	14 10/16,	/95 15:00:00	THERM-5	9510302-08A	Matrix Spike Dup	ICXC1016-14
10/16/95 15:00:00 THERM-6 9510302-03A Sample Dup . 1 Interm-7 9510302-04A Sample Dup . 1 Interm-8 9510302-04A Sample . 1 Interm-8 9510302-05A Sample . 1 Interm-8 CCV Continuing Calibration Check Interm-8 9510302-05A Sample . Interm-RB 9510302-06A S	15 10/16,	/95 15:00:00	THERM-6	9510302-02A	Sample	ICXC1016-15
10/16/95 15:00:00 THERM-7 9510302-04A Sample 10/16/95 15:00:00 THERM-8 9510302-05A Sample 10/16/95 15:00:00 Continuing Calibration Check Description Check 10/16/95 15:00:00 THERM-RB 9510302-06A Sample	16 10/16,	/95 15:00:00	THERM-6	9510302-03A	Sample Dup	ICXC1016-16
10/16/95 15:00:00 THERM-8 9510302-05A Sample Continuing Calibration Check 10/16/95 15:00:00 THERM-RB 9510302-06A Sample	17 10/16,	/95 15:00:00	THERM-7	9510302-04A	Sample	ICXC1016-17
10/16/95 15:00:00 CCV Continuing Calibration Check 10/16/95 15:00:00 THERM-RB 9510302-06A Sample	_	/95 15:00:00	THERM-8	9510302-05A	Sample	ICXC1016-18
10/16/95 15:00:00 THERM-RB 9510302-06A Sample	•	/95 15:00:00		200	Continuing Calibration Check	ICXC1016-19
	,	795 15:00:00	THERM-RB	9510302-06A	Sample	ICXC1016-20

Page 7

Work Order # 9510302

Digestion Batch #

Analysis Batch # WLICXC51016150001

Matrix W Report As received % Moisture Reporting Subset ____ Spikes Subset Specs Subset Instrument ICXC Analyst MH Column Date Collected 10/06/95
Date Received 10/10/95
Date Prepared Project Sample ID THERM-5 Lab Sample ID 9510302-01A Fite # ICXC1016-12 Method C Test Code

hod Chloride, by CARB 421 t Code CLIEMADO	Date Analyzed 10/16/95 15:00:00	75 15:00:00 Reviewer IDK	abers anser	D D D D D D D D D D D D D D D D D D D
		Aliquot Mass/Volume (mL) Extract/Digestate Volume 335 (mL) Dilution Factor 1000		
Analyte	CAS **	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	No_CAS	000896	28.8	28.8

Digestion Batch #

Page 8

Work Order # 9510302

Analysis Batch # WIICXC51016150001

Date Collected 10/06/95 Date Received 10/10/95

Project Sample ID THERM-6 Lab Sample ID 9510302-02A File # ICXC1016-15

Column

Instrument ICXC

Reporting Subset Spikes Subset

Matrix W Report As received % Moisture Specs Subset

File # ICXCIO16-15 Method Chloride, by CARB 421 Test Code CLIEWA00	Date Prepared 0ate Analyzed 10/16/95 15:00:00	Analyst MH /95 15:00:00 Reviewer TDK	Specs Subset	% Moisture
		Aliquot Mass/Volume (mL) Extract/Digestate Volume 356 (mL) Dilution Factor 1000		
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	1070000	28.8	28.8

Digestion Batch #

Page 9

Work Order # 9510302

Analysis Batch # WLICXC51016150001

Report As received % Moisture Matrix W Reporting Subset ____ Spikes Subset Specs Subset Instrument ICXC Reviewer IDK Analyst MH Column Date Prepared 10/16/95 15:00:00 Date Collected 10/06/95 Date Received 10/10/95 Lab Sample ID 9510302-03A DUP Method Chloride, by CARB 421 Project Sample ID THERM-6 File # ICXC1016-16 Test Code CLIEWA00

		Aliquot Mass/Volume (ml.)		
,		Extract/Digestate Volume 356 (ml) Dilution Factor 1000		
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	1110000	28.8	28.8

Analysis Batch # WLICXC51016150001 Digestion Batch #

Page 10

Work Order # 9510302

Instrument ICXC Reviewer IDK Analyst MH Column Date Analyzed 10/16/95 15:00:00 Date Collected 10/06/95 Date Received 10/10/95
Date Prepared Method Chloride, by CARB 421 Project Sample ID IHERM-7 Lab Sample ID 9510302-04A File # ICXC1016-17 Test Code CLIEWA00

Matrix W Report As <u>received</u> % Moisture Reporting Subset Spikes Subset ____ Specs Subset

		Aliquot Mass/Volume		
		(mL) Extract/Digestate Volume		
		348 (mL) Dilution Factor 1000		
		No section of the sec		
Analyte	CAS #	measured concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample
Chloride	NO_CAS	1370000	28.8	28.8

Work Order # 9510302

Digestion Batch #

Analysis Batch # WLICXC51016150001

Project Sample ID IHERM-8 Lab Sample ID 9510302-05A File # ICXC1016-18 Method Chloride, by CARB 421 Test Code CLIEWA00	Date Collected 10/06/95 Date Received 10/10/95 Date Prepared Date Analyzed 10/16/95 15:00:00	100 100	Reporting Subset Spikes Subset Specs Subset	Matrix W Report As received % Moisture	8
		Aliquot Mass/Volume (mL) Extract/Digestate Volume 268 (mL) Dilution Factor			
Analyte	CAS #	Measured Concentration ug/sample	Detection Limit ug/sample	Reporting Limit ug/sample	
Chloride	NO_CAS	QN	0.0288	0.0288	

Page 11

10/30/95 13:36:10

Analysis Batch # WLICXC51016150001 Digestion Batch #

Date Collected 10/06/95 Date Received

Method Chloride, by CARB 421

Test Code CLIEWA00

Project Sample ID THERM-RB Lab Sample ID 9510302-06A File # ICXC1016-20

Instrument ICXC

Report As received Matrix <u>W</u> Reporting Subset ____

% Moisture

Date Prepared Date Analyzed

Spikes SubsetSpecs Subset	
Column Analyst MH Reviewer IDK	Aliquot Mass/Volume (mL) Extract/Digestate Volume
10/16/95 10/16/95 15:00:00	Aliquo Extract/
ססס	1

Page 12

Work Order # 9510302

ug/sample Reporting Limit Detection Limit ug/sample

0.0288

0.0288

ug/sample

Ş

Measured Concentration

CAS #

Analyte

Chloride

NO_CAS

362 (ML)

Dilution Factor

Page 13

Work Order # 9510302

Digestion Batch #

Analysis Batch # WLICXC51016150001

Reviewer IDK Instrument I Analyst MH Column 10/16/95 15:00:00 Date Collected 10/06/95 Date Received 10/10/95 Date Analyzed Date Prepared File # ICXC1016-11
Method Chloride, by CARB 421 Project Sample ID THERM-RB Lab Sample ID 9510302-06A Test Code CLIEWA00

	received	
Matrix W	Report As	% Moisture
Wa	-	34
Reporting Subset	Spikes Subset	Specs Subset
ICXC	1	

		Aliquot Mass/Volume (mL)		
		Extract/Digestate Volume		
		362 (mL)		
		Dilution Factor 1		
		Measured Concentration	Detection Limit	Reporting Limit
Analyte	CAS #	ug/sample	ng/samble	ng/sample
Chloride	NO_CAS	ND	0.0288	0.0288

LABORATORY BLANK INFORMATION

Work Order # 9510302 Page 14

Digestion Batch # MIICXC51016150001

Reviewer IDK Date Prepared 10/16/95 15:00:00 File # ICXC1016-8 Method Chloride, by CARB 421 Lab Sample ID <u>8LK954402</u> Test Code CLIEWA00

Instrument ICXC Reporting Subset

Column Spikes Subset

Analyst MH Specs Subset

Matrix W

	Aliquot Mass/Volume (ml) Extract/Digestate Volume 1 (ml) Dilution Factor		
Analyte	Measured Conc. mg/L	Detection Limit mg/L	Reporting Limit mg/L
Chloride	QN	0.0288	0.0288

LABORATORY CONTROL SAMPLE

Digestion Batch #

Work Order # 9510302 Page 15

Analysis Batch # WLICXC51016150001

Instrument ICXC Reviewer IDK Analyst MH Column

Matrix W Reporting Subset Spikes Subset

(JE) (JE) Limit 2 Spec. 3.9 RPD Result Report As received Aliquot Mass or Vol Extract Mass or Vol High 112 Recovery Limits Spec. % Moisture Š 83 105 Rec. File ID ICXC1016-10 Lab Sample ID LCS Duplicate Measured 8.40 LCSD956982 Conc. mg/L Specs Subset 8.00 Spiked Conc. mg/L Rec. 101 Lab Sample ID File ID ICXC1016-9 Measured mg/L 8.09 Conc. 102956982 8.00 Spiked Conc J/Gw 10/16/95 15:00:00 Vol. Added Surrogate Sol'n # Date Analyzed Date Prepared Vol. Added Method Chloride, by CARB 421 Analyte Test Code CLIEWA00 Control Std. # 830849P87 Chloride

Page 16

Work Order # 9510302

Digestion Batch # WIICXC51016150001

Proje Metho Test

Project Sample ID THERM-5		Date Collected 10/06/95	10/06/95	Instru	Instrument ICXC	CXC	Reporting Subset	oset		Matrix W	3	
Method Chloride, by CARB 421	ı	Date Received	10/10/95	Column			Spikes Subset	oset		Report As	As rec	received
Test Code CLIEWA00		Date Prepared		Analyst MH	Æ		Specs Subset	oset —		% Moisture	Lre	
	·	Date Analyzed	10/16/95 15:00:00		Reviewer IDK						ļ	
Spike Sol'n # Vol. Added <u>B30849P86</u> 200 ul		Sample Lab Sample ID		Spiked Sample Lab Sample 10		ds	Spiked Sample Dup Lab Sample ID					
		9510302-01A File # ICXC1016-12	File 9	9510302-07A MS File # ICXC1016-13	1	Pi te	9510302-08A MSD File # ICXC1016-14					
Surrogate Sol'n Vol. Added		Aliquot Mass/Vol	AI.	Aliquot Mass/Vol	<u> </u>	At	Aliquot Mass/Vol					
		Extract Mass/Vol	ă	Extract Mass/Vol		Ä	TO (mL) Extract Mass/Vol		Recovery Specifi-	. تر ا- ت		-
		335 (mL) Dil Fact. 1000	, io	335 (mL) Dil Fact, 1000		io	335 (mL) Dil Fact. 1000		cation Limits		RPD	
-	Spike										1	Chacifi-
	Sol'n	Measured	Spiked	Measured		Spiked	Measured				3	cation
Analyte	Conc. mg/L	Conc. ug/sampl	Conc. ug/sampl	Conc. ug/sampl	Rec.	Conc. ug/sampl	Conc. ug/sampl	Rec.	₹ *	Low High Result		Limit %
Chloride	200	968000	1340000	2310000	100	1340000	2220000	76	8	120	6.2	20

VERIFICATION

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Work Order # 9510302

Analysis Batch # WLICXC51016150001

Initial Calibration # NA

Date Analyzed 10/16/95 15:00:00

Reporting Subset ____ Spikes Subset Specs Subset

Instrument ICXC Reviewer IDK Analyst MH

> Method Chloride, by CARB 421 Test Code CLIEWA00

File # ICXC1016-19 Lab Sample ID CCV

Recovery Specification Limits	High %	110
Reco Specif Lin	Low	06
	Recovery %	101
	Concentration mg/L	9.00
	Concentration	50*9
	Analyte	Chloride

VERIFICATION

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Work Order # 9510302

Analysis Batch # WLICXC51016150001

Initial Calibration # NA

Date Analyzed 10/16/95 15:00:00

Lab Sample ID ICV File # ICXC1016-7

Reporting Subset
Spikes Subset

Analyst MH

Instrument ICXC viewer TDK

Method Chloride, by CARB 421 Test Code CLIEWADO			Specs Subset		Revier
	Meaning	Reference		Recovery Specificati Limits	Recovery Specification Limits
Analyte	Concentration mg/L	Concentration mg/L	Recovery **	Low	High %
Chloride	00.9	9.00	100	06	110

Project Sample ID THERM-6

SAMPLE DUPLICATES Digestion Batch

Work Order # 9510302 Page 19

Analysis Batch # WLICXC51016150001

Date Collected 10/06/95

Instrument ICXC

Reporting Subset

Matrix W Report As received

Method Chloride, by CARB 421				Spikes Subset	Report
lest code <u>CLIEWAUU</u>	Date Freporeu Date Analyzed	10/16/95 15:00:00	E S		1 .
		Sample Lab Sample ID 9510302-02A Dil Fact. 1000	Duplicate Lab Sample ID 9510302-03A DUP Dil Fact. 1000	~	RPD
	Analyte	Measured Conc. ug/sample	Measured Conc. ug/sample	Result	Specification Limit %
345	Chloride	1070000	1110000	3.8	20

CHAIN-OF-CUSTODY FORMS

USE A BALLPOINT PEN AND PRESS FIRMLY THE INSTRUCTIONS FOR FILLING OUT THIS FORM ARE ON THE BACK

TASK OR SUB TASK (one per form):

CORPORA TO TO THE TO THE TO THE TO THE TO THE TO THE TO THE TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE TOTAL THE T

LABORATORY NAME & ADDRESS: Park Hadian Subs Study

AHn: Jon. Er Sundana 13808 THE INFORMATION IN THIS SECTION WILL NOT BE **AVAILABLE TO THE** 3000 DO

HTG30

AVAILABLE TO T	LABORATORY		LOCATION											SAMPLING COMMENTS:			
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4			<u> </u>	1351 -										* Duplicate analysis		D 8Y	
Subsection		3VITAV?	MATRIX CODE		,	,	Å	¹ →								RELINGUISED BY	
			UNITOUANTITY	500 m Can Pir	. —			\						COMMENTS:			
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Tract	- 13	2'A:	SAMPLE	ĕ₹				\rightarrow						DATE	0 12 195 lb :00	DATE	9 122/95
atrik	1-104	CTION	III	4	1	3	3	,							Ь		Ь
E. Therm	R: 266	COLLECTION	DATE	9-22-8				>						ED BY	2 46	Y8 03	
CONTRACT NAME: Thermatrix Treat, Study	CHARGE NUMBER: 269-104-13-		SAMPLE NUMBER	Therm-01	herm-03	Therm-03	12-m-04	Therm. A.R.						RÉLEASED BY	Arna Made	RECEIVED BY	7-P=

DO NO

WHITE . COORDINATOR / GOLDENROD . PROJECT DIRECTOR / PINK . SAMPLE CONTROL / YELLOW . LABORATORY / BLUE . LABORATORY RECEIPT

TIME

DATE

CHAIN-OF-CUSTODY RETURNED BY

TIME

DATE

DISPOSAL CONFIRMED BY

Add and drunk

W. Geby. 'D

8/23/88 1:40 95-11013

95/030

3/6/

Please contact Lisa Lafe or Jennifer Sandova w/any questions.

۲	5	<u> </u>
	Chain of Custody Becord	

8501 N. Mopac Bivd. P.O. Box 201088 Austin, Texas 78720-1088

							7	Analyses		
McClellan / Thermatrix	n The	rmatri	×					\	\	\
SITE Thermatrix Un: +	tix U	+ : <			7	42	1	\ \ \		\
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SAMPLE I.D.		TYPE	DAT	DATE/TIME	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	70 V				REMARKS
Therm-5		Air	<u>ସ</u>	10-6-95	×				B	Run I
Them - 6				-	×	X	Caution: High	Hah	4	Auna
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RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	BY:	RELINQUISHED BY:	SHED BY:	DATE	TIME	RECEIVED BY:	14:
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RECEIVED FOR LABORATORY BY:	BY:	DATE		TIME	REMARKS					
Mohly		10/10/	de	1830	July	molin	2101-59 #milning	1 N		
1		1			3	1)		

CHAIN OF CUSTODY ADDENDUM

RECEIVED BY: W. Geby: L	WORK ORDER(S): 9509449
DATE: 9/23/55	
UNPACKED DATE: 9/25/95	
NUMBER OF OUTER CONTAINERS RECEIVED	
WITH CHAIN OF CUSTODY	CLIENT CODE: THERMATICIY
See addendum # 36 95-1006 (Check the appropriate answer. Add comments or exp	for original airbill. As
CUSTODY SEAL ON COOLER/OUTER CONTAIN	TER BY: W.G.
Present	YES NO
Custody Number	nitialed. #NO
Container sealed with tape	YES NO
Scal is intact	YES NO
!! seal not intact, list air bill number of that co	ntainer(s).
SAMPLE TEMPERATURE UPON ARRIVAL BY:	$W.6$ PYROMETER # $\rho-2$
The temperature of the container(s) is: (accept	table tolerance 2 - 6°C)
1 <u>2</u> °C 2°C 3°C 4	_°C 5°C 6°C 7°C
When samples are received not requiring cooling	ngNA
If the temperature(s) are outside the acceptable	e range of 2 - 6°C
Client Services was notified, (CSC) YES
OK to analyze samples: YES	NO
All samples not listed below were within the ac affected and their temperatures:	eceptable temperature tolerance of 2 - 6°C. Samples
Sample ID Temp. (°C) Sample ID Tem	p. (°C) Sample ID Temp. (°C)
· · · · · · · · · · · · · · · · · · ·	

COND	ITION OF BO	ITLES/	CONTAINERS	BY:	105_(COMMEN	NT ANY PROB	LEMS)
	Bottles receive	d match	COC	•	1	/	YES	NO
	Bottles receive	d intact				<u>/</u>	YES	NO
	Comments:							
pH OF	SAMPLES/PR	ESERV	ATION	BY:	ps (COMMEN	NT ANY PROB	LEMS)
	Acid preserved	i sample:	s are <2 pH				_ YES	NO
	(as in	dicated b	y * on COC)					
	Base preserved	d sample	s are >12 pH				YES	_ NO
	(as in	dicated b	y # on COC)					
	Water samples	for Cya	nide checked			-	YES	NO
	(as no	ted with	a ✓ on COC)				÷	
	Water Sulfide	samples	appear to be pre	served w	ith zinc acetate	-	_ YES	NO
					•	1	_ NA	
	If pH/preserva	ation is o	outside acceptable	e limits. (Client Services w	as notifie	ď	-
			•	,			-	
	c	SC)	YI		ADJ		YES	NO
		SC)		ES	ILDA	JST		NO
	Sample IDs ar	SC) ad pH of	YI	ES d outside	ADJI	JST		NO
	Sample IDs ar	SC) ad pH of	samples received	ES d outside	ADJI	JST		NO
	Sample IDs an	SC) ad pH of bles not l	samples received	ES I outside	ADJI of acceptable pl	JST H range.	YES	-
	Sample IDs an	SC) ad pH of bles not l	samples received	ES I outside	ADJI of acceptable pl	JST H range.	YES	-
	Sample IDs an	SC) ad pH of bles not l	samples received	ES I outside	ADJI of acceptable pl	JST H range.	YES	-
SHIPPI	Sample IDs and All other sample ID	SC) ad pH of oles not l pH ——	samples received isted are at the a	ES I outside	ADJI of acceptable pl	JST H range.	YES	-
SHIPPI	Sample IDs and All other sample ID Sample ID Comments:	SC) ad pH of oles not l pH	samples received isted are at the a Sample ID	ES d outside appropria pH	ADJU of acceptable pl ate pH. Sample ID	JST H range.	YES	-
	Sample IDs and All other sample ID Sample ID Comments:	SC) ad pH of oles not l pH NTATIO	samples received isted are at the a Sample ID	ehain-of-o	ADJI of acceptable pl ate pH. Sample ID	JST H range. pH	YES _	pH ——
OTHE	Sample IDs and All other sample ID Sample ID Comments: ING DOCUME Freightbill is a R COMMENTS	SC) ad pH of oles not l pH cNTATIO vailable a	samples received isted are at the a Sample ID ON and attached to a diddle dum	ehain-of-o	ADJU of acceptable pl ate pH. Sample ID custody.	JST H range. pH	YESYESYESYES	pH — — NO JOS
OTHE CLIEN RECEI	Sample IDs and All other sample ID Sample ID Comments: ING DOCUME Freightbill is a R COMMENTS TO CHAIN-OF-COMMENTS.	SC) ad pH of oles not l pH CNTATION vailable a CUSTOE HE SAM	samples received isted are at the a Sample ID	ehain-of-o	ADJU of acceptable pl ate pH. Sample ID custody. WITH TIME B	JST H range. pH Y SAMP	YESYESYESYES	pH — — NO JOS
OTHE CLIEN RECEI	Sample IDs and All other sample ID Sample ID Comments: ING DOCUME Freightbill is a R COMMENTS TO CHAIN-OF-OVED, WITH TO CHAIN-OVED, WITH TO CHAIN-O	SC) ad pH of oles not l pH CNTATION vailable a CUSTOE HE SAM	samples received isted are at the a Sample ID Sample ID ON and attached to a delegate during the strength of the strength o	ehain-of-o	ADJU of acceptable pl ate pH. Sample ID custody. WITH TIME B	JST H range. pH Y SAMP	YESYESYESYES	pH — — NO JOS

QUALITY CONTROL EXCEPTION REPORT LEVEL 2 - SAMPLE CONTROL

REPORT COPY 9510302

R # 951010-01		Revised:	
Analyst: <u>CDASHBY</u> Batch #: Ana		Date Analyzed: Status:	
Lab Sample ID: Client ID: 9510302 THERMATRIX	CSC 	Project Sample ID:	
Sample pH Sample Temperature X Bubbles/Headspace in VOA Vials Sample Broken Insufficient Sample Size Holding Time Exceeded Upon Receipt Other (Describe)		RECTIVE ACTION TAKEN: Resample Log for Analysis Log Using Alternate Split Use spare split Adjust Preservation Level 3 QCER to Follow Other (Describe)	<u>X</u>
nments: <u>ALL SAMPLES RECEIVED</u>	FOR Cl ANALY	SIS AT AMBIENT TEMPERATURE.	

1073

CHAIN OF CUSTODY ADDENDUM

RECEIVED BY: Washluf	WORK ORDER(S): 95/0302
DATE: 10/10/95	
UNPACKED DATE: 10/10/95	
NUMBER OF OUTER CONTAINERS RECEIVED	
WITH CHAIN OF CUSTODY / ///	CLIENT CODE: Thirmituy
(Check the appropriate answer. Add comments or explanate CUSTODY SEAL ON COOLER/OUTER CONTAINER	ΛM
Present	YES NO
Custody Number	# NO
Container sealed with tape	YESNO
Scal is intact	YESNO
If seal not intact, list air bill number of that contain	er(s).
SAMPLE TEMPERATURE UPON ARRIVAL BY:	PYROMETER #
The temperature of the container(s) is: (acceptable	tolerance 2 - 6°C)
1°C 2°C 3°C 4°C	5°C 6°C 7°C
When samples are received not requiring cooling	NA
If the temperature(s) are outside the acceptable ran	ge of 2 - 6°C
Client Services was notified,	YES
OK to analyze samples: YES _	NO
All samples not listed below were within the accepta affected and their temperatures:	able temperature tolerance of 2 - 6°C. Samples
Sample ID Temp. (C) Sample ID Temp. (C)	Sample ID Temp. (°C)

COND	OTTION OF BO	TTLES/	CONTAINERS	B√.		COM		
	Bottles receive			٠.٠	(COMME	NT ANY PROP YES	•
	Bottles receive						_ YES	NO
	Comments:	o muc				_1/_	YES	NO
	Commence							
pH OF	SAMPLES/PR	ESERV	ATION	BY:_	COA (СОММЕ	NT ANY PROI	BLEMS)
	Acid preserved	d sample	es are <2 pH			*****	_ YES	NO
	(as in	dicated 1	by * on COC)				•	
	Base preserved	d sample	es are >12 pH				_ YES	NO
	(as inc	dicated l	by # on COC)					
	Water samples	for Cya	anide checked			•	_ YES	NO
	(as no	ted with	a ✓ on COC)					
	Water Sulfide	samples	appear to be pr	eserved w	vith zinc acetate		YES	NG
			-			V	NA NA	```
	If pH/preserva	ition is d	outside accentabl	a limita	Client Services v		· · · ·	
	F / F		ouside acceptabl	c minics,	CHCHI OCIVICES A	~as mounte		
	(C:			ES				NO
	c	SC)	Y	ES	ADJ	UST	YES _	NO
	Sample IDs an	SC) d pH of	samples receive	ES d outside	ADJ	UST		NO
	Sample IDs an	SC) d pH of	Y	ES d outside appropria	ADJ	UST H range.		NO
	Sample IDs an All other samp	SC) d pH of	samples receive	ES d outside appropria	ADJ of acceptable p	UST H range.	YES	
	Sample IDs an All other samp	SC) d pH of	samples receive	ES d outside appropria	ADJ of acceptable p	UST H range.	YES	
	Sample IDs an All other samp	SC) d pH of	samples receive	ES d outside appropria	ADJ of acceptable p	UST H range.	YES	
SHIPPI	Sample IDs an All other samp Sample ID	SC) d pH of oles not pH	samples receive	ES d outside appropria	ADJ of acceptable p	UST H range.	YES	
SHIPPI	Sample IDs an All other samp Sample ID Comments:	SC) d pH of oles not pH	samples received listed are at the Sample ID	ES d outside appropria pH —	ADJ of acceptable p ate pH. Sample ID	UST H range.	YES	
SHIPPI	Sample IDs an All other samp Sample ID Comments: NG DOCUME: Freightbill is as	SC) d pH of oles not i pH NTATIO	samples received listed are at the Sample ID	ES d outside appropria pH ——	ADJ of acceptable p ite pH. Sample ID	UST H range.	YES	pH ——
	Sample IDs an All other samp Sample ID Comments: NG DOCUME: Freightbill is as	SC) d pH of ples not in pH NTATION TATION TA	samples received listed are at the Sample ID	ES d outside appropria pH ——	ADJ of acceptable p ite pH. Sample ID	UST H range.	YES	
OTHER CLIENT RECEI	Sample IDs an All other samp Sample ID Comments: NG DOCUME Freightbill is av R COMMENTS	SC) d pH of ples not pH wailable custor HE SAM	samples received listed are at the Sample ID	ES d outside appropria pH — chain-of-o	ADJ of acceptable p ate pH. Sample ID custody.	UST	YESYES	pH —— ——
OTHER CLIENT RECEI	Sample IDs an All other samp Sample ID Comments: NG DOCUME Freightbill is av R COMMENTS I CHAIN-OF-C VED, WITH TH	SC) d pH of ples not pH wailable custor HE SAM	samples received listed are at the Sample ID ON and attached to A A A A A A A A A A A A A A A A A A	ES d outside appropria pH — chain-of-o	ADJ of acceptable p ate pH. Sample ID custody. WITH TIME E ENDUM NUMB	PH ————————————————————————————————————	YESYES	pH —— NO

ATTACHMENT C CALIBRATION DATA

DRY GAS METER CALIBRATION DATA

Dry Gas Meter # <u>SAC - 05</u> Calibration Meter # 309 Barometric Pressure Pb = 29.99 in. Hg

Orifice		Gas Volume	e, ft³		Temperatur				Į	
Manometer (ΔH) In H ₂ O		Cal. Meter (Ve)	Dry Gas Meter (V _d)		Calibration Meter (Tc)	Dry (Meter in		Time (\(\Delta\text{t}\) minutes	γ*	∆H@•
	tinei	71.812	727,006	initial	91	98	92	4.42.65		
40	initial	66.632	721.900	mid.	91	102	92	(4.710)	1.015	1.9/
	total	5.180	5.106	final	7/	102	//	J. 77		
				avg.	91		.5			
	tinal	78.055	733.200	inttal	92	99	94	6.39.55		
2.0.	Initial	72-925	728.100	mid.	92	102	95	(6.659)	1.012	1-94
	total	5.130	5.100	final	92	107	96	<u>u</u> ,,,,		
	<u>. I </u>			avg.	92	98	7./			
	final	83.743	738-898	initial	92	100	96	9.13.23		
1.0	initial	78.643	733.800	mid.	92	102	97	(9.220)	1.011	1.88
	total	5-100	5.098	finai	92	103	98	(1.22)		
				avg.	92	9	9.3		,	
	tinal	89.433	744.600	Initial	92	101	98	12 47.79	7	
0.5	Initia	84.350	739.499	mid.	92	102	99	12.47.78 (12.796)	1.011	1-82
	total	5.08)	5.101	final	92	103	100	12.796	<u> </u>	
				avg.	92	10	0.5			·
	٠ ۲	$= \frac{V_{\bullet}}{V_{\bullet}} \left[\frac{T_{\bullet} + 46}{T_{\bullet} + 46} \right]$	io P.	-1		Pre-Test	x	Avg.	1.012	1.89
		L			Ì	Post-Te		Pre- Test Avg.		
		$= 0.0317 (\Delta H) \left(\frac{\Delta}{V} \right)$	• •	-))	L		9	2.60	Swell	
Da	ite Cal	librated:	9-11-95			Ву:		-cn /10	mee	

The γ and $\Delta H @$ values have been checked using the 'DGM-Calc' Program.

NOTE: Use a minimum volume of 5 ft³ at all ΔH values.

Acceptable Pre-Test Values: $(\gamma \times 0.98) \le \gamma \le (\gamma \times 1.02)$ $(\Delta H@ \times 0.8) \le \Delta H@ \le (\Delta H@ \times 1.2)$ Acceptable Post-Test Values: $(\gamma_{Pre} \times 0.95) \le \gamma_{Pre} \le (\gamma_{Pre} \times 1.05)$

DRY GAS METER CALIBRATION DATA

Dry Gas Meter # SAC-05 Calibration Meter # 309 Barometric Pressure Pb = 30.13 in. Hg

Orifice		Gas Volum	e, ft³		Temperature					
Manometer (ΔΗ) In H ₂ O		Cal. Meter (Ve)	Dry Gas Meter (V _d)		Calibration Meter (T _c)	Dry Meter In		Time (Δt) minutes	74	∆H@ª
	tinal	0 22.107	149.489 5	initial	72	72	70			
4.0	Initial	× 27.23 2	154,504	mid.	72	73	70	4.75	1.010	1.93
	total	5.125	5.015	finet	72	75	70			
				avg.	72	٦	1			
	final	32.353	159.555	Intial	73	74	70			
2.0	initial	27.232	154,504	mid.	73	76	71	6.70	1,009	1,92
	total	5.12	5.051	final	73	76	72			
				avg.	73	7.	3. <i>a</i>			
	final	37,389	164.557	initiai	73	75	72			
1.0	Initial	32.353	159.555	mid.	73	78	73	9.2	1,008	1.86
	total	5,036	5.002	final	73	79	74			
				avg.	73	7	5.2			
	final	42.403	169.560	initial	73	77	75			
0.5	initial	37.389	164.557	mid.	74	80	76	12,8	1.009	1,82
	total	5.014	5,003	final	74	81	78			
Ĺ				avg.	73.7	7-	1.8			
	٠ ٢ ء	V. T. +460	$\frac{1}{p_b} = \frac{p_b}{p_b + (\frac{\omega \eta}{13.6})}$	3).13 PI	re-Test		Avg.	1.009	1.903
		_		ے ہرت	9732	ost-Tes		Pre- Test Avg.	1.012	1.89
Date	∆H@ = e Call	: 0.0317 (ДН) (V. brated:	(T. + 460) ² P. (T. + 460) 10 24 9	5	o.99 <i>87</i> %	Ву: _	y	OKa1	e	

The γ and $\Delta H@$ values have been checked using the 'DGM-Calc' Program.

NOTE: Use a minimum volume of 5 ft³ at all ΔH values.

Acceptable Pre-Test Values: $(\frac{7 \times 0.98}{2}) \le 7 \le (\frac{7 \times 1.02}{2})$

 $(\Delta H@ \times 0.8) \leq \Delta H@ \leq (\Delta H@ \times 1.2)$ Acceptable Post-Test Values: $(\gamma_{Pro} \times 0.95) \leq \gamma_{Pros} \leq (\gamma_{Pro} \times 1.05)$

RADIAN

DRY GAS METER CALIBRATION DATA

Dry Gas Meter # SAC-Ol

Calibration Meter # 309

Barometric Pressure Pb = 29.92 in. Hg

Orifice		Gas Volum	e, ft³		Temperatur	es, °F				
Manometer (∆H) In H₂O		Cal. Meter (Ve)	Dry Gas Meter (V _d)		Calibration Meter (T _c)	Dry Meter In		Time (Δt) minutes	γ*	∆H@*
	finai	396.272	608,415	initiai	81	80	80	4.7		
4.0	initiai	391.047	603.203	mid.	81	81	80		0,992	1.86
	total	5,225	5,212	final	81	82	81		·	
				avg.	81	80	7		, - :	
	final	401.294	613,432	intial	21	83	81	6.4	0,999	1.86
2,0	initial	396,272	608,415	midL	81	84	81	. ,		
3,,,	total	5.022	5,017	final	81	84	82			5
				avg.	81	82	2,5			
	final	406.318	618.467	initial	81	85	82	9.1	1,001	1.87
1.0	Initial	401,294	613.432	mid.	81	86	82			.,,
	total	5,024	5,035	final	81	87	83			
				avg.	81	34	,a			
	tinal	411,300	623.476	initial	32	86	83	12.5	1,000	1.79
0.5	Initial	406.318	618.467	mid.	82	27	84		,	•
	total	4.982	5.009	final	82	88	85			
				avg.	82	85	5.5			
	• Y=	V. T. +46	0 P _b + (^{ΔH} / _{13.8})	.]	F	Pre-Test	<u>/</u>	Avg.	0.998	1.84
		-	$0 \int P_b + (\frac{\omega t}{13.8})^2$ $(T_a + 460)^2$)]		Post-Tes /acuum		Pre- Test Avg.		

 $^{\bullet}\Delta H@ = 0.0317 (\Delta H) \left(\frac{\Delta t}{V_{e}}\right)^{2} \frac{(T_{e} + 460)^{2}}{P_{b} (T_{d} + 460)}$

Date Calibrated: 10/6/95

By: Lisa Late

The γ and ΔH @ values have been checked using the 'DGM-Calc' Program.

NOTE: Use a minimum volume of 5 ft³ at all ΔH values.

Acceptable Pre-Test Values: $(\frac{7 \times 0.98}{2}) \le \gamma \le (\frac{7 \times 1.02}{2})$

 $(\Delta H@ \times 0.8) \leq \Delta H@ \leq (\Delta H@ \times 1.2)$

Acceptable Post-Test Values: $(\gamma_{Pro} \times 0.95) \le \gamma_{Prox} \le (\gamma_{Pro} \times 1.05)$

APPENDIX B
Field Data Sheets

Thermatrix Treatability Study System Parameter Data Field Log

			(gH									
			WSIS	Blower	Blower	Blower Outlet		Thermatrix Flow		Thermatrix	1011	COMMERSIA
			***	Inlet	Outlet	#	Natural		Calculated		Outlet	College
		Sampler's	System	Vacuum	Pressure	Temperature	Gas Flow	Pressure	Flow		l emperature	Collected
Date	Time	Initials	Vacuum	(in. Hg)	(bsi)	(°F)	(efm)	(in. H ₂ O)	(ctm)	1 (ps i)(v _C)	(⁷ F)	(Sample ID)
21/6	1500	CJM	3.15	15	82.0	180	9	0.80	4,8	1601	110	714-05/
2/6	1530	CJM	2. 7.	ũ	Si'O	180	S	0,75	4,7	1001	110	
4/12	1610	CJM.	3,4.	3	` 	bL1	9	0,75	L'b	1991	011	post sample
0/12	1945	ζ. M	2.5	13.	2.	160	∢ Z	0,85	5.0	9091	724.	CUNNING ON
912	1950	CIM	35	17	2	791	N	6.85	5.0	1600	Draw CHL)	1
9 4	0955	S	35	15.	7	156	20	0.85	5.0	1601.	MACOUST)	. ,
9/14	1135	COM	3.5	ī.	2	(60	5	58'0	5.0	9091	cho (
9/15	1755	Ci	3,5	3	0.5	170	4 2	58:0	5,0	1660	45	AMBIED T
9/15	3000	(A)	35	72	0.5	188	N	0.85	6.0	0091	26	VATOR TURNED CDS
9/19	(1624F)	M	27	15	1.5	170	, b	6.9	5.1	0091	80	-
9/19	j	CUM	22	15		160	3	0.85	5.0	<j291< th=""><th>85</th><th>TIN-COS TEN-COS</th></j291<>	85	TIN-COS TEN-COS
9/19	İ	SW	4.7	15	.—	185	4	0.95	5. 0	1600	85	Prist Spure
5/ 5	19.15	₹	5.3	<u>7</u>		281	4	53:0	5.0	1600	155	
9/16	345	SIN	4.3	Ō	_	150	45	9 3. 0	5.0	(250 NG)	48	AFTER SHUTDOWN. TO SWITCH PUMP COURS
02/6	06120	W 53	2,25	<u>v</u>		170	4.0	0.90	5.1	0091	175	TIN-OUT REST

^a If sample collected, indicate corresponding sample ID(s).

Pcm= 1.41319 7 Px 14,7

Pane 1 of 4

			(新									
			GIEMA	Blower		Hower and	(SC+1)	Thermatrix Flow	low	Thermatrix	Outlet	Sample
		Complete	SVE	Vacilitie	Dressure		Gas Flow	Pressure	Flow	Procestive	Temperature	Collected?
Date	Time	Sample	Vacuum	(in. Hg)	(isd)	(°F)	(CEE)	(in. H ₂ O)	(ctm)	o (C (pgri)	(°F)	(Sample ID)ª
9/20/1045	045	C JW	2.3	5	-	180	4	0.85	5.0/	1600 -	180	POST INFLUENT SAM
9/20/05/1149	145	CTM	2,7	5	`-	180	4	0.90	21.5	,0091	185	PCST TEX-449
9/2/195 0910	2810	SAF	7	7	_	09)	h	0.85	5.0′	1600	1659	TIN-0/0
3/21/12/905	2060	SAF	۶۲	7	-	691	4	0.85	5.0	1600	175	→
5h60 26/17/16	Sht	SAF	2.0	15	P	05)	4	28.0	5.0	1600	(50	TEN-AZ
058084216	0530	SAF	2.0	51	5.1	051	h	06'0	1.5	1600	160	TIN-013
9/2195 09 \$5	19 45	SAC	2.0	1	1.5	451	ħ	960	1-5	009/	162.50	TENSTAB
9/2995 0745	346	SAF	2,0	15	0.6	041	7	06.0	2.1.5	1600	135°	TIN-014 FEN-015
8480842/6	848	SAF	2.0	51	200	451	t	0.90	7.5	1600	1450	POST: TIN- SUR TEN-OCS
9 July 1800	800	SAF	0.0	51	0.	591	4	58.0	کر:٥	1598	150	No
9/22/K 0915	3915	SAF), (15	1.5	451	ħ	58.0	5.0′	1600	140°	TEN-017
0101 12/16/6	070,	SAF	2.0	15	2.	162	7	58-0	5.0	1600	148°	POSTINGG TENOIZ
5180 56/2/6	5180	SAF	0 7	15	2.	152	Ž	05-0	1.5	009/	2400	TIN-018
1/24/15	8/0/	SAP	7.43	16	5.1	09/	4	0.85	6.0	1600	2400	812-147 TOO
	6730	SAF	2.15	\	1.0.	851	4	0.90	5.1	1600	bayge	TIN-020'
-												

^a If sample collected, indicate corresponding sample ID(s).

Page 2 of 4

Thermatrix Treatability Study System Parameter Data Field Log

		CAIC. CAIN	2011010	H		\blacksquare	Thermatrix Flow	WO	Thermatrix		
1	王础		Diet	Outlet	Discontinuity (1) the Natural			Calculated	Outlet	Outlet	Sample
Sampler's Sy) 8	System	Vacuum	Pressure	Temperature	Gas Flow	Pressure	Flow	Pressure	Temperature	Collected?
Time Initials Va	\ \ 	Vacuum	(in. Hg)	(psi)	(P)	(cfm) -	(in. H ₂ O)	(ctm)	T (BOD) T	(F)	(Sample ID)
0730 SAF 2		2.25	15/	1	170	4	0.30	5.1	1600	bayes riverting	POST TEN-826
CAM		2.1	61	_	180,	4	58'0	5.0.	1600	GRAGENOT WORKING	ON
1	<u> </u>	2.25	51	75.	051	4	58.0	5.0	1600	>	TIN-022 TEN-623
		Outers		Restertect	sc (. C. 12	0	0500				
_1		2.1	3)	\\ \'\.	8 41	4	580	5.0	1590	barge in that to	TIN-022
SAF	 	2.1	ا کا	5.1	h5/	4	5.85	, O, Y	1600	>	POST TEN-023
		UNIT	Com	to re	apair st	Stack.	·				
152 CRF		1-16	15		180	4	0.85	0.5	099/	110°F	HCC Sampling
SAP	 -	2.1	19	5.0	176	4	0.85	5.0	1600	120°F	TIN-XIEND
1840 SAF	+	2.1	15,	5.0	176	þ	0.85	,o-S	009/	1227	Post Hec Runts
0720 CAF	+	2.5	15	2.1	851	ħ	6.0	1.5	1600	60 y 8	
+	1	25.4	15.	1.5	791	7	6.0	1.5	0091	, 1	PUST 71 N-26
-	1	1.5	.51	0.	180	ή	0.85	2.0.	1600	bayes mathing	TIN-028 TEN-029
 	 	5.	7	0.5	24/	Ť	0.85	2.0	1600	<i>\</i>	Pest TIN- 478 TEN-429
$\ $	4										

^a If sample collected, indicate corresponding sample ID(s).

Thermatrix Treatability Study System Parameter Data Field Log

4

							 	 	 	
Sample	ပ လွ	TIN-030 TEN-03, TEX-08								
Outlet	Temperature (°F)	Gaype brasthanchewy	1							
Thermatrix	Pressure (psi)	1600	(600							
0w Calculated	Calculated Flow (cfm)	5.0	5.0							
Thermatrix Flow	Pressure (in. H ₂ O)	58.0	28-0							
Natural	•	\uparrow	ħ							
Intet	Temperature (°F)	166	170							
Blower	(i)	Q	0							
Blower	Vacuum (in. Hg)	13)	18							
a/s	System Vacuum	1.75	1.75							
	Sampler's Initials	SAF	SAF						·	
	Time	0930	02/1 /3/21/01							
	Date	0560 51/51/01	53/51/01	-						

^a If sample collected, indicate corresponding sample ID(s).

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APPENDIX C

Quality Control Data Assessment

THERMATRIX Treatability Study QUALITY ASSURANCE/QUALITY CONTROL RESULTS

This section presents the results of the Quality Assurance/Quality Control (QA/QC) data assessment for 30 air samples analyzed by Method TO-14, and 29 air samples analyzed by Method 18 modified. The samples were analyzed by Air Toxics Ltd. (Folsom, California). Quality control (QC) samples collected to assess contamination, precision and accuracy for the data set are presented in the following order: blanks (reagent); spikes (method and surrogate); duplicates (lab and field).

Overall, the QC sample results indicate good accuracy and precision for the sampling and analysis procedures. No reagent blank contamination was indicated. All of the method spikes (with one exception), and surrogate spike recoveries, and all of the Relative Percent Differences (RPDs) for laboratory duplicate samples, and field duplicates met established data quality objectives.

Reagent Blanks

Reagent blanks are used to demonstrate that interferences or contamination from the analytical system, including glassware and reagents used in the analytical procedure, are under laboratory control. No target analytes were detected, indicating that the analytical system was free of contamination and no sample results are affected.

Method Spikes

Method spikes, also known as laboratory control samples (LCS), are a solution of method analytes at known concentrations that are spiked into ultra high purity compressed air and analyzed to assess the accuracy of the method. The results are reported as the percent recovery of each spiked compound. One method spike recovery for o-xylene had a slightly low recovery. Three project sample results for o-xylene were qualified as "J-" estimated potentially biased low.

Surrogate Spikes

Surrogates were added to every sample, blank, and method spike to monitor both the performance of the analytical system and the effectiveness of the method in recovering the compounds of interest for each sample matrix. The percent recovery of the surrogate spike compounds were compared to the recovery objectives established for the method. All surrogate

spike results met acceptable limits, indicating that there were no problems associated with recovering target analytes using these methods.

Duplicates

Laboratory Duplicates

Laboratory duplicates are repeated, independent analyses of the same sample, by the same analyst, at essentially the same time and under the same conditions. The sample is split in the laboratory, and each fraction is carried through all stages of sample preparation and analysis. Duplicate analyses are used to assess the precision of each analytical method. Three project samples had laboratory duplicates performed by Method TO-14 (TIN-010, TIN-020, TIN-030). One project sample TIN-20 had a laboratory duplicate performed by Method 18 modified. Twenty-two pairs of results RPD's were all less than 29%, which is within acceptable limits for precision and indicates good overall reproducibility.

Field Duplicates

Field duplicate samples are used to evaluate the precision of the total measurement system and estimate variability in the entire sampling and analytical process. The sample identified as TIX-007 was a field duplicate of sample TIN-007, and TEX-032 was a field duplicate of TEN-031. Analysis of these samples by method TO-14 and Method 18 modified yielded seven analyte pairs for which RPD's could be calculated. All the calculated RPD's met the data quality objectives, indicating good precision and reproducibility.

Holding Times

Method protocol specifies the maximum amount of time a sample can be stored before analysis (i.e., the sample "holding time"). All samples were analyzed within the required holding times from sample collection to analysis.

Calibration Ranges

Five samples for trichloroethene by Method TO-14 exceeded the instrument calibration range, but were within linear range. These results were "J+" flagged estimated potentially biased high. Chloroform and toluene results for sample TIN-010 were reported below the detection limits, and have been qualified "U" non-detected at the specified detection limit.

TABLE 1. Qualified Data

METHOD	ANALYTE	REASON	QUAL FLAG		SAMPLE ID
TO-14	Trichloroethene	Calibration range exceeded, within linear range.	J+	TIN-010	TIN-016 TIN-020 TIN-020 (laboratory duplicate)
TO-14	o-Xylene	Method spike had a low recovery	J-	TIN-007 TIX-008	TEN-009
TO-14	Chloroform Toluene	Results reported below detection limit	U	TIN-010	

Sample name:TIN-001				Sample name: TEN-002			
DC:9/12/95				DC:9/12/95			
DA:9/13/95				DA:9/13/95			
9509096A-01A				9509096A-002A			
TO-14	result	P	dilution	TO-14	recult	₹	dilution
	(vddd)	(vddd)	factor		(vduu)	(vdod)	factor
Vinyl chloride	*QN	2,800	2,600	Vinyl chloride	*ON	0.95	19
1,1-Dichloroethene	ND	2,800	2,600	1,1-Dichloroethene	2	0.95	6
Freon 113	ND	2,800	2,600	Freon 113	S	0.95	19
cis-1,2-Dichloroethene	19,000	2,800	2,600	cis-1,2-Dichloroethene	0.98	0.95	1.9
Chloroform	ND	2,800	2,600	Chloroform	Q N	0.95	1-0
1,1,1-Trichloroethane	Q	2,800	5,600	1,1,1-Trichloroethane	Q	0.95	1.9
Benzene	3,700	2,800	2,600	Benzene	7	0.95	1 9
Trichloroethene	000'099	2,800	2,600	Trichloroethene	32	0.95	1.9
Toluene	ND	2,800	2,600	Toluene	QN	0.95	10
Tetrachloroethene	ND	2,800	2,600	Tetrachloroethene	Q.	0.95	6
m,p-Xylene	3,800	2,800	5,600	m,p-Xylene	QN	0.95	1.9
o-Xylene	3,600	2,800	5,600	o-Xylene	QN.	0.95	1.9
Acetone	Q	11,000	5,600	Acetone	10	3.8	1.9
Modified Method 18				Modified Method 18			
950906B-01A				950906B-02A			
Vinyl chloride	3,300	100	2	Vinyl chloride	S	95	1.9
*Vinyl chloride method spike recovery out high 138%	nike recove	y out high	1280/				
Samples were ND so no gualification	disalification	I y out ingil	9/001				
Samples were the so the	qualification						

Sample name:TIN-003				Sample name:TEN-004			
DC:9/14/95			-	DC:9/14/95			
DA:9/16/95				DA:9/16/95			
9509113A-01A				9509133A-02A			
TO-14	result	þ	dilution	TO-14	result	₽	dilution
	(vdaa)	(vddd)	factor		(vqdd)	(vadd)	factor
Vinvl chloride	S	1,900	3,700	Vinyl chloride	Q	6.0	1.8
1.1-Dichloroethene	Q.	1,900	3,700	1,1-Dichloroethene	9	6.0	1.8
Freon 113	QN	1,900	3,700	Freon 113	QN	6.0	1.8
cis-1.2-Dichloroethene	21,000	1,900	3,700	cis-1,2-Dichloroethene	1.3	6.0	7
Chloroform	2.100	1,900	3,700	Chloroform	2	6.0	1.8
1.1.1-Trichloroethane	S	1,900	3,700	1,1,1-Trichloroethane	QN	6.0	1.8
Benzene	4,200	1,900	3,700	Benzene	2.1	6.0	1 .8
Trichloroethene	000'069	1,900	3,700	Trichloroethene	51	6.0	1.8
Toluene	Q	1,900	3,700	Toluene	3.2	6.0	1.8
Tetrachloroethene	QN	1,900	3,700	Tetrachloroethene	ΩN	6.0	.
m.p-Xylene	6,300	1,900	3,700	m,p-Xylene	2.1	6.0	1 .8
o-Xylene	5,200	1,900	3,700	o-Xylene	1.4	6.0	1 .8
Acetone	2	7,400	3,700	Acetone	16	3.6	7.8
Modified Method 18				Modified Method 18			
9509133B-01A				9509133B-02A			
Vinvl chloride	2,400	95	1.9	Vinyl chloride	DN	120	2.4

Control of the cont								
result di dilution TO-14 result (ppbv) (ppbv	Sample name: TIN-005				Sample name:TEN-006			
result di dilution TO-14 result (ppbv) factor (ppbv) (ppbv) factor (ppbv) (ppbv	DC:9/19/95				DC:9/19/95			
result di dilution TO-14 result (ppbv) factor (ppbv) factor (ppbv) factor (ppbv) 1,300 3,900 Vinyl chloride ND 1,900 3,900 1,1-Dichloroethene ND 1,900 3,900 Chloroform ND 1,900 3,900 Chloroform ND 1,900 3,900 Chloroform ND 2,800 1,900 3,900 Trichloroethene ND 570,000 1,900 3,900 Trichloroethene ND 1,900 3,900 Trichloroethene ND 1,900 3,900 Trichloroethene ND 1,900 3,900 Trichloroethene ND 1,900 3,900 Toluene ND 1,900 3,900 Tetrachloroethene ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 Acetone 38 6,300 ND 1,900 3,900 ND 1,900 ND 1,900 3,900 ND 1,900 ND 1,900 1,900 1,900 1,900 ND 1,900 1,900 1,900 ND 1,900 1,900 ND 1,	UA:9/20/95				DA:9/20/95			
result dl dilution TO-14 result (ppbv) (ppbv) factor Vinyl chloride (ppbv) ND 1,900 3,900 Vinyl chloride ND bethene ND 1,900 3,900 Freon 113 ND bethene 17,000 1,900 3,900 Chloroform A ND 1,900 3,900 Chloroform ND sthane ND 1,900 3,900 Trichloroethene ND s 570,000 1,900 3,900 Trichloroethene ND s 570,000 1,900 3,900 Trichloroethene ND s 570,000 1,900 3,900 Tetrachloroethene ND nD 1,900 3,900 Acetone	9509167A-01A				9509167A-O2A			
(ppbv) (factor Vinyl chloride (ppbv) ND 1,900 3,900 Vinyl chloride ND ND 1,900 3,900 1,1-Dichloroethene ND ND 1,900 3,900 Freon 113 ND ethane 17,000 1,900 3,900 Chloroform A ethane ND 1,900 3,900 Chloroform ND ethane ND 1,900 3,900 Trichloroethene ND sthane ND 1,900 3,900 Trichloroethene ND sho 1,900 3,900 Tetrachloroethene ND ne ND 1,900 3,900 Tetrachloroethene ND ne ND 1,900 3,900 ND Actone 4,2 e,300 1,900 3,900 0-Xylene ND ND nb 7,600 3,900 Acetone 38 dc,300 1,900 3,900 Acetone <t< td=""><td>TO-14</td><td>result</td><td>Ð</td><td>dilution</td><td>TO-14</td><td>result</td><td>Ð</td><td>dilution</td></t<>	TO-14	result	Ð	dilution	TO-14	result	Ð	dilution
ND 1,900 3,900 Vinyl chloride ND ND 1,900 3,900 1,1-Dichloroethene ND Dethene 17,000 1,900 3,900 Chloroform ND Sthane ND 1,900 3,900 Chloroform ND Sthane ND 1,900 3,900 Chloroform ND Sthane ND 1,900 3,900 Trichloroethene ND STO,000 1,900 3,900 Toluene ND SND 1,900 3,900 Toluene AC SA,700 1,900 3,900 Toluene AC ND 7,600 3,900 Acetone 38 MO 7,600 3,900 Acetone 38 STO,000		(vddd)	(vddd)	factor		(vqdd)	(vqdd)	factor
tene ND 1,900 3,900 1,1-Dichloroethene ND 1,900 3,900 Freon 113	Vinyl chloride	Q	1,900	3,900	Vinyl chloride	ND	3.7	7.4
ND 1,900 3,900 Freon 113 5ethene 17,000 1,900 3,900 cis-1,2-Dichloroethene ethane ND 1,900 3,900 Chloroform ethane ND 1,900 3,900 Trichloroethene s 570,000 1,900 3,900 Toluene sne ND 1,900 3,900 Tetrachloroethene ne ND 1,900 3,900 Tetrachloroethene c6,300 1,900 3,900 Tetrachloroethene npermission ND 7,600 3,900 Acetone dd 18 ND 7,600 3,900 Acetone dd 18 ND 7,600 3,900 Acetone dd 18 9509167B-02A Vinvl chloride	1,1-Dichloroethene	Q.	1,900	3,900	1,1-Dichloroethene	QN	3.7	7.4
bethene 17,000 1,900 3,900 cis-1,2-Dichloroethene ethane ND 1,900 3,900 Chloroform ethane ND 1,900 3,900 1,1,1-Trichloroethane s 570,000 1,900 3,900 Trichloroethene sne ND 1,900 3,900 Tetrachloroethene ne ND 1,900 3,900 Tetrachloroethene chance 1,900 3,900 Tetrachloroethene chance 1,900 3,900 Tetrachloroethene chance 1,900 3,900 Tetrachloroethene chance 1,900 3,900 Mp-Xylene chance 1,900 3,900 Acetone data 1,900 3,900 Acetone <td< td=""><td>Freon 113</td><td>2</td><td>1,900</td><td>3,900</td><td>Freon 113</td><td>QN</td><td>3.7</td><td>7.4</td></td<>	Freon 113	2	1,900	3,900	Freon 113	QN	3.7	7.4
Albert (a) 1,900 3,900 Chloroform ethane ND 1,900 3,900 1,1,1-Trichloroethane 2,800 1,900 3,900 Trichloroethene 3,900 Trichloroethene Trichloroethene 3,900 Tetrachloroethene Tetrachloroethene 7,700 1,900 3,900 m,p-Xylene 6,300 1,900 3,900 o-Xylene ND 7,600 3,900 Acetone dd 18 Modified Method 18 2,500 95 1,9	cis-1,2-Dichloroethene	17,000	1,900	3,900	cis-1,2-Dichloroethene	4	3.7	7.4
thane ND 1,900 3,900 1,1,1-Trichloroethane 2,800 1,900 3,900 Benzene	Chloroform	2	1,900	3,900	Chloroform	QN	3.7	7.4
2,800 1,900 3,900 Benzene 570,000 1,900 3,900 Trichloroethene ND 1,900 3,900 Toluene ND 1,900 3,900 Tetrachloroethene 7,700 1,900 3,900 m,p-Xylene 6,300 1,900 3,900 Acetone ND 7,600 3,900 Acetone d 18 Modified Method 18 9509167B-02A	1,1,1-Trichloroethane	Q	1,900	3,900	1,1,1-Trichloroethane	QN	3.7	7.4
a 570,000 1,900 3,900 Trichloroethene ND 1,900 3,900 Toluene and 1,900 1,900 3,900 Tetrachloroethene 7,700 1,900 3,900 m,p-Xylene 6,300 1,900 3,900 Acetone ND 7,600 3,900 Acetone d 18 Modified Method 18 9509167B-02A	Benzene	2,800	1,900	3,900	Benzene	QN	3.7	7.4
ND 1,900 3,900 Toluene 2,700 1,900 3,900 Tetrachloroethene 6,300 1,900 3,900 m.p-Xylene ND 7,600 3,900 Acetone Acetone Modified Method 18 6,300 3,900 Acetone	Trichloroethene	570,000	1,900	3,900	Trichloroethene	110	3.7	7.4
Ad 18 ND 1,900 3,900 Tetrachloroethene 7,700 1,900 3,900 m,p-Xylene 6,300 1,900 3,900 o-Xylene ND 7,600 3,900 Acetone Acetone Ad 18 Modified Method 18 9509167B-02A Vinyl chloride	Toluene	2	1,900	3,900	Toluene	S	3.7	7.4
7,700 1,900 3,900 m.p-Xylene 6,300 1,900 3,900 o-Xylene ND 7,600 3,900 Acetone Ad 18 Modified Method 18 9509167B-02A	Tetrachloroethene	Q	1,900	3,900	Tetrachloroethene	Q	3.7	7.4
d 18	m,p-Xylene	7,700	1,900	3,900	m,p-Xylene	4.2	3.7	7.4
d 18 Modified Method 18 S500 S500 S500 S500 S500 S500 S600 S6	o-Xylene	6,300	1,900	3,900	o-Xylene	QN	3.7	7.4
rd 18 Modified Method 18 9509167B-02A 2,500 95 1.9 Vinyl chloride	Acetone	2	7,600	3,900	Acetone	38	15	7.4
nd 18 Modified Method 18 9509167B-02A 2,500 95 1.9 Vinvl chloride								
2,500 95 1.9 Vinvl chloride	Modified Method 18				Modified Method 18			
2,500 95 1.9 Vinyl chloride	9509167B-01A				9509167B-02A	of the season of		
opilouis (Vinyl chloride	2,500	95	1.9	Vinyl chloride	ND	110	2.3

Sample name: TIN-007 [TIX-008 field d	TIX-008 field duplicate	ate			Sample name: TEN-009			
DC:9/20/95				1	DC:9/20/95			
DA:9/22/95					DA:9/22/95			
TO-14	result	Пр	dilution		TO-14	result	P	dilution
	(\nqdd)	(Addd)	factor	RPD		(vddd)	(vqdd)	factor
Vinyl chloride	S	1,400	2,700		Vinyl chloride	2	က	6.2
1,1-Dichloroethene	2	1,400	2,700		1,1-Dichloroethene	2	က	6.2
Freon 113	Q.	1,400	2,700		Freon 113	2	က	6.2
cis-1,2-Dichloroethene	11,000[12,000]	1,400	2,700	8.7%	cis-1,2-Dichloroethene	8.7	က	6.2
Chloroform	ND[1,400]	1,400	2,700	ð	Chloroform	2	က	6.2
1,1,1-Trichloroethane	2	1,400	2,700		1,1,1-Trichloroethane	2	က	6.2
Benzene	1,800[1,900]	1,400	2,700	5.4%	Benzene	2	က	6.2
Trichloroethene	360,000[360,000]	1,400	2,700	%0.0	Trichloroethene	250	က	6.2
Toluene	S	1,400	2,700		Toluene	2	က	6.2
Tetrachloroethene	S	1,400	2,700		Tetrachloroethene	S	က	6.2
m,p-Xylene	4,300[4,700]	1,400	2,700	8.9%	m,p-Xylene	3.3	က	6.2
o-Xylene	2,600[3,100]*J-	1,400	2,700	17.5%	o-Xylene	?O. QN	က	6.2
Acetone	Q	5,400	2,700		Acetone	27	12	6.2
					1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			
Modified Method 18					Modified Method 16			
Vinvl chloride	1.800	110	2.1		Vinyl chloride	Q	110	2.1
	[1,700]	[06]	[1.8]	2.7%				
*o-Xylene method spike recovery out low 61%	recovery out low 67	1%						
Detects qualified (J-) estimated potenti	stimated potential lov	al low bias						
Non-detects qualified (LL) notential lov	J.D notential low bias	5						

Sample name: Tikl 040					Laboratory Duplicate			
Sample Harrie. I IN-010					Sample name: TIN-010			
DC:9/21/95					DC:9/21/95			
DA:9/26/95					DA:9/26/95			
					9509210A-01B			-
TO 44	-							
41-01	result	ਰ	dilution		TO-14	result	ᄝ	dilution
	(vadd)	(hddd)	factor	RPD		(vqdd)	(vddd)	factor
Vinyl chloride	Q	2,200	4,400	ð	Vinyl chloride	2,800	490	980
1,1-Dichloroethene	2	2,200	4,400		1,1-Dichloroethene	9	490	980
Freon 113	Q N	2,200	4,400		Freon 113	QN.	490	980
cis-1,2-Dichloroethene	20,000	2,200	4,400	4.5%	cis-1,2-Dichloroethene	21,000	490	980
Chloroform	1,600*∪	2,200	4,400	ð	Chloroform	1,900	490	980
1,1,1-Trichloroethane	ND	2,200	4,400		1,1,1-Trichloroethane	Q.	490	980
Benzene	3,300	2,200	4,400	0.0%	Benzene	3.300	490	980
Trichloroethene	640,000		4,400	3.1%	Trichloroethene	>660,000**J+	490	980
Toluene	1,500*U	2,200	4,400	ð	Toluene	1.300	490	980
Tetrachloroethene	Q.	2,200	4,400		Tetrachloroethene	2	490	086
m,p-Xylene	6,400	2,200	4,400	14.5%	m,p-Xylene	7,400	490	980
o-Xylene	5,100	2,200	4,400	19.5%	o-Xylene	6,200	490	980
Acetone	2	8,800	4,400		Acetone	ND	2,000	980
Modified Method 18					Modified Method 18			
9509210B-01A					95-9210B-01B			
Vinyl chloride	2,700	100	2	25.0%	Vinyl chloride	2,100	100	2.1
* chloroform and toluene reported below detection limits	reported be	elow detecti	on limits		** TCF saturated neak data renorded as estimated	ata reported as	octimated	
qualified (U) non-detect					ouglify (+) estimated as	dia lepolica as	commarca	
					idualiiy (27) estilliated potential nigh blas	nential nign bia	S	

Sample name: TIN-010				Sample name:TEN-011			
DC:9/21/95				DC:9/21/95			
DA:9/26/95				DA:9/25/95			
9509210A-01A				9509210A-02A			
TO-14	result	Þ	dilution	TO-14	result	P	dilution
	(vddd)	(nqdd)	factor		(vqdd)	(vqdd)	factor
Vinyl chloride	2	2,200	4,400	Vinyl chloride	Q	1.1	2.1
1,1-Dichloroethene	Q	2,200	4,400	1,1-Dichloroethene	2	1.1	2.1
Freon 113	Q	2,200	4,400	Freon 113	2	1.1	2.1
cis-1,2-Dichloroethene	20,000	2,200	4,400	cis-1,2-Dichloroethene	Ω	1.1	2.1
Chloroform	1,600*∪	2,200	4,400	Chloroform	2	1.1	2.1
1,1,1-Trichloroethane	2	2,200	4,400	1,1,1-Trichloroethane	Q	1.1	2.1
Benzene	3,300	2,200	4,400	Benzene	QN	1.1	2.1
Trichloroethene	640,000	2,200	4,400	Trichloroethene	QN	1.1	2.1
Toluene	1,500*U	2,200	4,400	Toluene	QN	1.1	2.1
Tetrachloroethene	2	2,200	4,400	Tetrachloroethene	9	1.1	2.1
m,p-Xylene	6,400	2,200	4,400	m,p-Xylene	QN	1.1	2.1
o-Xylene	5,100	2,200	4,400	o-Xylene	QN	1.1	2.1
Acetone	Q	8,800	4,400	Acetone	9.5	4.2	2.1
Modified Method 18				Modified Method 18			
9509210B-01A				9509210B-02A			
Vinyl chloride	2,700	100	2	Vinyl chloride	9	110.0	2.1
* chloroform and toluene reported below detection limits	e reported b	elow detect	tion limits				
qualified (U) non-detect	-						

Sample name: TIN-013				Sample name: TEN-012			
DC:9/22/95				DC:9/22/95			
DA:9/26/95				DA:9/26/95			
9509210A-04A				950210A-03A			
TO-14	result	5	dilution	TO-14	result	ō	dilution
	(vddd)	(vqdd)	factor		(vdqd)	(vqdd)	factor
Vinyl chloride	Q.	1,800	3,500	Vinyl chloride	2	1.6	3.2
1,1-Dichloroethene	Q	1,800	3,500	1,1-Dichloroethene	Q	1.6	3.2
Freon 113	Q	1,800	3,500	Freon 113	Q	1.6	3.2
cis-1,2-Dichloroethene	18,000	1,800	3,500	cis-1,2-Dichloroethene	Q	1.6	3.2
Chloroform	1,800	1,800	3,500	Chloroform	9	1.6	3.2
1,1,1-Trichloroethane	Q	1,800	3,500	1,1,1-Trichloroethane	QN	1.6	3.2
Benzene	3,000	1,800	3,500	Benzene	Q	1.6	3.2
Trichloroethene	_620,000E*J+	1,800	3,500	Trichloroethene	QN	1.6	3.2
Toluene	2	1,800	3,500	Toluene	QN	1.6	3.2
Tetrachloroethene	2	1,800	3,500	Tetrachloroethene	Q	1.6	3.2
m,p-Xylene	6,000	1,800	3,500	m,p-Xylene	QN	1.6	3.2
o-Xylene	4,600	1,800	3,500	o-Xylene	2	9.	3.2
Acetone	QN	7,000	3,500	Acetone	Q	6.4	3.2
Modified Method 18				Modified Method 18			
9509210B-04A				9509210B-03A			
Vinyl chloride	2,500	95	1.9	Vinyl chloride	QN	95	1.9
*TOE averaged collibration		ithic is					
for exceeded callulati	oil lailge, but v	out within miear lange	lange				
ilag (J+) estimated potential nign bias	ntial high bias						

Sample name: TIN-014			-	Sample name: TEN-015			
DC:9/25/95				DC:9/25/95			
DA:9/26/95				DA:9/26/95			
9509235A-01A				9509235A-02A			
TO-14	rocult	7	dilution	TO-14	result	þ	dilution
		(vdaa)	factor		(vddd)	(vddd)	factor
Vinvl chloride	Q	1,900	3,800	Vinyl chloride	QN	3.2	6.4
1.1-Dichloroethene	2	1,900	3,800	1,1-Dichloroethene	QN	3.2	6.4
Freon 113	2	1,900	3,800	Freon 113	ND	3.2	6.4
cis-1,2-Dichloroethene	16,000	1,900	3,800	cis-1,2-Dichloroethene	Q	3.2	6.4
Chloroform	2	1,900	3,800	Chloroform	2	3.2	6.4
1.1.1-Trichloroethane	9	1,900	3,800	1,1,1-Trichloroethane	QN	3.2	6.4
Benzene	2,300	1,900	3,800	Benzene	QN	3.2	6.4
Trichloroethene	540,000	1,900	3,800	Trichloroethene	QN	3.2	6.4
Toluene	9	1,900	3,800	Toluene	QN.	3.2	6.4
Tetrachloroethene	ND	1,900	3,800	Tetrachloroethene	QN	3.2	6.4
m.p-Xylene	4,800	1,900	3,800	m,p-Xylene	QN	3.2	6.4
o-Xvlene	3,400	1,900	3,800	o-Xylene	QN	3.2	6.4
Acetone	2	7,600	3,800	Acetone	QN	13	6.4
			-				
Modified Method 18				Modified Method 18			
9509235B-01A				9509235B-02A			
Vinyl chloride	2,800	95	1.9	Vinyl chloride	ND	95	1.9

Sample name: TIN-016				Sample name: TEN-017			
DC:9/27/95				DC:9/27/95			
DA:9/27/95				DA:9/28/95			
9509271A-01A				9509271A-02A			
TO-14	result	ਰ	dilution	TO-14	result	ē	dilution
	(vqdd)	(vqdd)	factor	111111111111111111111111111111111111111	(vdqd)	(vddd)	factor
	*QN		2,400	Vinyl chloride	*ON	1.1	2.1
roethene	ND	1,200	2,400	1,1-Dichloroethene	Q	1.1	2.1
	QQ.		2,400	Freon 113	Q	1.1	2.1
loroethene	14,000		2,400	cis-1,2-Dichloroethene	2	1.1	2.1
. !	Q		2,400	Chloroform	Q	1.1	2.1
chloroethane	ND	1,200	2,400	1,1,1-Trichloroethane	Q	1.1	2.1
	1,900	1,200	2,400	Benzene	QN	1.1	2.1
ethene	470,000E*J+	1,200	2,400	Trichloroethene	QN	1.1	2.1
	Q		2,400	Toluene	QN	1.1	2.1
ethene	9		2,400	Tetrachloroethene	QN	1.1	2.1
m,p-Xylene	5,400	1,200	2,400	m,p-Xylene	QN	1.1	2.1
o-Xylene	3,900	1,200	2,400	o-Xylene	QN	1.1	2.1
Acetone	Q.	4,800	2,400	Acetone	34	4.2	2.1
						744	
Modified Method 18				Modified Method 18			
9509271-01A				9509271-02A			
Vinyl chloride	4,600	490	8.6	Vinyl chloride	QN	110	2.1
* Vinyl choride method spike high recovery 135%	pike high recov	very 135%					
samples non-detect so no flag	o flag						
**TCE exceeded calibration range but within linear range	ion range but	within linear	opuer.				
flag (J+) estimated potential high hias	ntial high hias		0				
	2512 118111 15111						

Sample pame: TIN-018				Sample name: TEN-019			
Salliple Hame: The Sto				DC:9/29/95			
DC.8/28/83				DA:10/2/95			
9509313A-01A				950313A-02A			
TO 44	result	þ	dilution	TO-14	result	5	dilution
1	(vdud)	(vdaa)	factor		(vddd)	(vqdd)	factor
Visual obligation	1 800	750	1.500	Vinyl chloride	2	2.9	5.8
VIII) Cirolide	20.	750	1 500	1,1-Dichloroethene	Q	2.9	5.8
1, I-DICHOIDEMENE		750	1,500	Freon 113	Q	2.9	5.8
riedii 113	21 000	750	1 500	cis-1,2-Dichloroethene	Q	2.9	5.8
Chloroform	200,12	750	1.500	Chloroform	Q	2.9	5.8
4 4 4 Trichloroathana	CN	750	1.500	1,1,1-Trichloroethane	Q	2.9	5.8
1,1,1	2 500	750	1 500	Benzene	2	2.9	5.8
Benzene	2,300	750	1,500	Trichloroethene	2	2.9	5.8
Trichloroethene	000,076	250	,200	Tolione	S	2.9	5.8
Toluene	1,300	06/	000,1	Totachloroothono	2	29	22
Tetrachloroethene	QN	750	1,500	I ettacilloroenielle	2 2	oic	4
m.p-Xylene	7,100	750	1,500	m,p-Xylene	3 5	6.2	2 4
o-Xvlene	6.000	750	1,500	o-Xylene	2	6.2	0.0
Acetone	9	3,000	1,500	Acetone	16	12	5.8
Mandified Mathod 18				Modified Method 18			
OI POINT DOINT				9509313B-02A			
Winyl obloride				Vinyl chloride	ΩN	75	1.5

Sample name: TIN-20				Sample name: TEN-21			
DC:10/2/95				DC:10/2/95			
DA:10/3/95				DA:10/4/95			
9510008A-01A				9510008A-02A			
TO-14	result	p	dilution	TO-14	result	P	dilution
	(vqdd)	(nqdd)	factor		(pdpd)	(vqdd)	factor
Vinyl chloride	1,900	1,400	2,800	Vinyl chloride	9	1.5	3.0
1,1-Dichloroethene	Q	1,400	2,800	1,1-Dichloroethene	2	1.5	3.0
Freon 113	QN	1,400	2,800	Freon 113	Q.	1.5	3.0
cis-1,2-Dichloroethene	23,000	1,400	2,800	cis-1,2-Dichloroethene	2	1.5	3.0
Chloroform	2,400	1,400	2,800	Chloroform	Q.	1.5	3.0
1,1,1-Trichloroethane	QN		2,800	1,1,1-Trichloroethane	Q.	1.5	3.0
Benzene	2,400		2,800	Benzene	4.8	1.5	3.0
Trichloroethene	660,000E*J+	1,400	2,800	Trichloroethene	Q	1.5	3.0
Toluene	1,800	1,400	2,800	Toluene	3.2	1.5	3.0
Tetrachloroethene	2	1,400	2,800	Tetrachloroethene	Ω	1.5	3.0
m,p-Xylene	8,800	1,400	2,800	m,p-Xylene	ΩN	1.5	3.0
o-Xylene	8,200	1,400	2,800	o-Xylene	ΩN	1.5	3.0
Acetone	ON	5,600	2,800	Acetone	14.0	0.9	3.0
Modified Method 18				Modified Method 18			
				951008B-02A			
Vinyl chloride	N/A			Vinyl chloride	8	100.0	2.0
*TCE exceeded calibration rang	on range, but	e, but within linear range	ar range				
flag (J+) estimated potential hig	ntial high bias) 				

Sample name:TIN-020 Sample name:TIN-020 Canalysis CC:10/295 DC:10/295 DA:10/295 PA:10/295 PA:10/295 DA:10/395 DA:10/395 PA:10/395 PA:10/395 DA:10/395 DA:10/395 PA:10/395 PA:10/395 TO-14 result dliution RPD TO-14 result dliution TO-14 result dliution RPD TO-14 result dliution TO-14 result dliution RPD TO-14 result dliution TO-14 (ppby) factor (ppby) factor 1,400 2,800 1,1-Dichloroethene ND 1,400 2,800 1,1-Dichloroethene 1,400 2,800 1,1-Trichloroethene ND 1,400 2,800 1,1-Trichloroethene 2,400 1,400 2,800 1,1-Trichloroethene 8,200 1,400 2,800 1,1-Trichloroethene 8,700 1,400 2,800 1,1-Trichloroethene 8,800 1,400 2,800 <th></th> <th></th> <th></th> <th></th> <th></th> <th>Laboratory Duplicate</th> <th></th> <th></th> <th></th>						Laboratory Duplicate			
DC:10/2/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/3/95 DA:10/9/95 DA:10/99 DA:10/9	Samule name: TIN-020					Sample name: TIN-020			
PA:10/3/95 PA:10/3/95 PA:10/3/95 PA:10/3/95 PA:10/3/95 PA:10/3/95 PA:10/9/95 PA:10/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/9/95 PA:10/95 PA:	DC:10/2/95					DC:10/2/95			
result di dilution RPD TO-14 result di dilution RPD TO-14 (ppbv)	DA-10/3/95					DA:10/3/95	-		
Continuo	9510008A-01A					9510008A-01B			
Tresult Clipby Tactor Tresult Clipby Tactor Tresult Clipby Tactor Clipby Tactor Clipby Tactor Clipby Tactor Tactor Clipby Tactor									
Charle Cheby Cheby factor Cheby Ch	TO-14	result	P	dilution	RPD	TO-14	result	5	dilution
1,900		(vddd)	(nqdd)	factor			(vqdd)	(hadd)	tactor
ND	Vinyl chloride	1,900	1,400	2,800	23.0%	Vinyl chloride	2,400	1,400	2,800
ND	1 1-Dichloroethene	CN	1.400	2,800		1,1-Dichloroethene	pu	1,400	2,800
23,000 1,400 2,800 0.0% cis-1,2-Dichloroethene 23,000 1,400 2,400 1,400 2,800 0.0% Chloroform 2,400 1,400 2,400 1,400 2,800 0.0% Benzene 2,400 1,400 2,400 1,400 2,800 1.5% Trichloroethene 2,400 1,400 660,000E*1+ 1,400 2,800 1.5% Trichloroethene 2,400 1,400 1,800 1,400 2,800 1.7% Toluene 1,700 1,400 ND 1,400 2,800 1.1% m,p-Xylene 8,700 1,400 8,200 1,400 2,800 13.0% 0-Xylene ND 5,600 ND 5,600 2,800 13.0% Acetone ND 5,600 ND 5,600 2,800 13.0% Acetone ND 5,600 ND 5,600 2,800 Ninyl chloride ND 5,600	From 113	QN	1.400	2,800		Freon 113	pu	1,400	2,800
2,400	cis-1 2-Dichloroethene	23.000	1.400	2,800	%0.0	cis-1,2-Dichloroethene	23,000	1,400	2,800
Incomplementation ND 1,400 2,800 0.0% Benzene 2,400 1,400	Chloroform	2.400	1,400	2,800	%0.0	Chloroform	2,400	1,400	2,800
2,400 1,400 2,800 0.0% Benzene 2,400 1,400 660,000 = 1,400 2,800 1.5% Trichloroethene 670,000 = 1,400 1,400 1,800 1,400 2,800 5,7% Toluene 1,700 1,400 1,800 1,400 2,800 1,1% m,p-Xylene 8,700 1,400 8,200 1,400 2,800 13.0% 0-Xylene 7,200 1,400 ND 5,600 2,800 Acetone ND 5,600 18 ND 5,600 1,400 18 ND 5,600 1,400 18 ND 1,400 1,400 18 ND 1,400 1,400 18 ND 5,600 1,400 18 ND 1,400 1,400 18 ND 1,400 1,400 18 ND 1,400 1,400 18 ND 1,400 1,400 10	4 1 1-Trichloroethane	CN	1 400	2.800		1,1,1-Trichloroethane	Q	1,400	2,800
660 000E*1+ 1,400 2,800 1.5% Trichloroethene 670 000E*1+ 1,400 1,800 1,400 2,800 5.7% Toluene 1,700 1,400 ND 1,400 2,800 1.1% m,p-Xylene 8,700 1,400 8,800 1,400 2,800 13.0% o-Xylene 7,200 1,400 ND 5,600 2,800 Acetone ND 5,600 ND 5,600 2,800 ND 5,600 ND 5,600 1,400 5,600 ND 5,600 1,400 ND 5,600 1,400 ND 5,600 1,400 ND 5,600 1,400 ND 1,400 1,400 ND 1,400 <td>Renzene</td> <td>2.400</td> <td>1.400</td> <td>2,800</td> <td>%0.0</td> <td>Benzene</td> <td>2,400</td> <td>1,400</td> <td>2,800</td>	Renzene	2.400	1.400	2,800	%0.0	Benzene	2,400	1,400	2,800
1,800	Trichloroethene	660 000E*J+]	2,800	1.5%	Trichloroethene	670,000E*J+	1,400	2,800
ND	Tolliene	1.800	1,400	2,800	5.7%	Toluene	1,700	1,400	2,800
8,800 1,400 2,800 1.1% m,p-Xylene 8,700 1,400 8,200 1,400 2,800 13.0% o-Xylene 7,200 1,400 ND 5,600 2,800 Acetone ND 5,600 18 Modified Method 18 Modified Method 18 Image:	Tetrachloroethene	QN	1.400	2,800		Tetrachloroethene	QN	1,400	2,800
8,200	m n-Xvlene	8.800	1.400	2,800	1.1%	m,p-Xylene	8,700	1,400	2,800
ND 5,600 2,800 Acetone ND 5,600 Method 18 Modified Method 18 Cinyl chloride Ceeded calibration range, but within linear range Vinyl chloride Ceeded calibration range	n-Xylene	8,200	1.400	2,800	13.0%	o-Xylene	7,200	1,400	2,800
ut within linear range	Acetone	9	5.600	2,800		Acetone	QN	2,600	2,800
ut within linear range									
ut within linear range						Manager Marthad 40			
ut within linear range	Modified Method 18					Modified Method 10			
*TCE exceeded calibration range, but within linear range	Vinyl chloride					Vinyl chloride			
*TCE exceeded calibration range, but within linear range									
I CE exceeded calibration Farings, but writing the second call of the	trdilog behaves TOTA	tud opaca acid	within lines	יו נפתמף					
	-ICE exceeded calibra	HOIL LAINGE, DUI	WILLIAM INICO	a lange					

Sample name:TIN-022					Sample name: TEN-023			
DC:10/4/95					DC:10/4/95			
DA:10/5/95				***************************************	DA:10/5/95			
9510036A-01A					9510008A-02A			
TO-14	result	₽	dilution		10-14	result	lþ	dilution
	(vqdd)	(vqdd)	factor			(vdad)	(vdaa)	factor
Vinyl chloride	ND	1,900	3,800		Vinyl chloride	2	1.5	3.0
1,1-Dichloroethene	Q	1,900	3,800		1,1-Dichloroethene	2	1.5	3.0
Freon 113	Q	1,900	3,800		Freon 113	QN	1.5	3.0
cis-1,2-Dichloroethene	19,000	1,900	3,800		cis-1,2-Dichloroethene	9	1.5	3.0
Chloroform	Q	1,900	3,800		Chloroform	2	1.5	3.0
1,1,1-Trichloroethane	2	1,900	3,800		1,1,1-Trichloroethane	Ω	1.5	3.0
Benzene	3,400	1,900	3,800		Benzene	Q	1.5	3.0
Trichloroethene	290,000	1,900	3,800		Trichloroethene	2.8	5.1	3.0
Toluene	S	1,900	3,800		Toluene	Q	1.5	3.0
Tetrachloroethene	ND	1,900	3,800		Tetrachloroethene	QN	1.5	3.0
m,p-Xylene	6,800	1,900	3,800		m,p-Xylene	9	1.5	3.0
o-Xylene	4,900	1,900	3,800		o-Xylene	Q	1.5	3.0
Acetone	2	7,600	3,800		Acetone	6.4	0.0	3.0
Modified Method 18					Modified Method 18			
9510036B-01A					910036B-02A			
Vinyl chloride	2,800	65	1.3	RPD	Vinyl chloride	9	65.0	1.3
(laboratory duplicate)	2,100	65	1.3	28.6				

Sample name: TIN-024				Sample name: TEN-025			
DC:10/6/95				DC:10/6/95			
DA:10/11/95				DA:10/11/95			
9510085A-01A				95100085A-02A			
TO-14	result	đ	dilution	TO-14	result	Ð	dilution
	(vdad)	(vddd)	factor		(vqdd)	(vadd)	factor
Vinyl chloride	QN.	1,800	3,800	Vinyl chloride	ND	2.4	4.7
1.1-Dichloroethene	QN	1,800	3,800	1,1-Dichloroethene	ΩN	2.4	4.7
Freon 113	QN	1,800	3,800	Freon 113	ΩN	2.4	4.7
cis-1.2-Dichloroethene	20,000	1,800	3,800	cis-1,2-Dichloroethene	Q	2.4	4.7
Chloroform	2	1,800	3,800	Chloroform	2	2.4	4.7
1.1.1-Trichloroethane	QN	1,800	3,800	1,1,1-Trichloroethane	Q	2.4	4.7
Benzene	2,500	1,800	3,800	Benzene	QN	2.4	4.7
Trichloroethene	560,000	1,800	3,800	Trichloroethene	4.1	2.4	4.7
Toluene	2	1,800	3,800	Toluene	Q.	2.4	4.7
Tetrachloroethene	QN	1,800	3,800	Tetrachloroethene	ΩN	2.4	4.7
m.p-Xvlene	7,500	1,800	3,800	m,p-Xylene	4.1	2.4	4.7
o-Xylene	6,800	1,800	3,800	o-Xylene	3.6	2.4	4.7
Acetone	2	7,200	3,800	Acetone	10.0	9.4	4.7
Modified Method 18				Modified Method 18			
9510085B-01A				9510085B-02A			
Vinyl chloride	2,300	75	1.5	Vinyl chloride	620.0	75.0	1.5

Sample name: TIN-026 DC:10/10/95 DA:10/11/95 9510099A-01A TO-14 result (ppbv)			Sample name: TEN-027			
710/95 711/95 99A-01A		T				
99A-01A			DC:10/10/95			
99A-01A			DA:10/11/95			
, in a later of the later of th			9510008A-02A			
	ID III	dilution	TO-14	result	٦	dilution
_	(vddd) (factor		(vddd)	(vqdd)	factor
2	1,100	2,100	Vinyl chloride	Q	1.4	2.8
1,1-Dichloroethene ND	1,100	2,100	1,1-Dichloroethene	2	1.4	2.8
	1,100	2,100	Freon 113	Q	1.4	2.8
loroethene	0 1,100	2,100	cis-1,2-Dichloroethene	Q	1.4	2.8
Chloroform 1,600		2,100	Chloroform	Q	1.4	2.8
1,1,1-Trichloroethane ND	1,100	2,100	1,1,1-Trichloroethane	QN	1.4	2.8
		2,100	Benzene	2.0	1.4	2.8
ethene 480		2,100	Trichloroethene	1.7	1.4	2.8
Toluene	1,100	2,100	Toluene	4.5	1.4	2.8
Tetrachloroethene ND		2,100	Tetrachloroethene	ΩN	1.4	2.8
ne	1,100	2,100	m,p-Xylene	2.6	4.1	2.8
o-Xylene 4,800	1,100	2,100	o-Xylene	۵	4.1	2.8
Acetone ND	4,200	2,100	Acetone	9.6	5.6	2.8
Modified Method 18			Modified Method 18			
A			9510099B-02A			
Vinyl chloride 2,600	80	1.6	Vinyl chloride	ND	70.0	1.4

Sample name: TIN-028				Sample name: TEN-029			
DC:10/11/95				DC:10/11/95			
DA:10/13/95				DA:10/13/95			
9510133A-01A				9510133A-02A			
TO 14	theref	7	dilution	TO-14	result	Ð	dilution
1	(Adaa)	(vddd)	factor		(vqdd)	(vddd)	factor
Vinyl chloride	QN	1.200	2,400	Vinyl chloride	ND	0.9	- 8
1 1-Dichloroethene	2	1.200	2,400	1,1-Dichloroethene	ΩN	0.9	1.8
Fran 113	CZ	1.200	2.400	Freon 113	Q	0.9	- 8.
ris.1 2-Dichloroethene	17,000	1.200	2,400	cis-1,2-Dichloroethene	Q	6.0	1.8
Chloroform	1 600	1 200	2.400	Chloroform	QN	6.0	1.8
1 1 1-Trichloroethane	CN	1 200	2.400	1,1,1-Trichloroethane	2	6.0	1.8
Donzono	2 000	1 200	2.400	Benzene	2	6.0	1.8
Trichloroethene	500 000*:1+	1.200	2.400	Trichloroethene	Q	6.0	1.8
Tolliene	ON	1.200	2.400	Toluene	QN	0.9	1.8
Tetrachloroethene	S	1 200	2.400	Tetrachloroethene	QN	0.9	1.8
m n-Xvlene	6 700	1 200	2.400	m,p-Xylene	Q	6.0	1.8
n.,p-xylene	5,800	1.200	2.400	o-Xylene	ON	0.9	1.8
Acetone	Q	4,800	2,400	Acetone	7.9	3.6	1.8
Modified Method 18				Modified Method 18			
9510133B-01A				9510133B-03A			
Vinyl chloride	2,500	70	1.4	Vinyl chloride	2	75.0	1.5
*TCF exceeded calibration range, but within linear range	ion range, but v	vithin lines	ır range				
	1:-1 -:-						

					Laboratory Duplicate			
Sample name:TIN-030					Sample name: TIN-030			
DC:10/13/95					DC:10/13/95			
DA:10/16/95					DA:10/16/95			
9510149-01A					9510149A-01B			
TO-14	result	Ð	dilution		TO-14	result	P	dilution
	(vddd)	(vqdd)	factor	RPD		(vqdd)	(nqdd)	factor
Vinyl chloride	QN	1,900	3,800		Vinyl chloride	Q	1,900	3,800
1,1-Dichloroethene	QN	1,900	3,800		1,1-Dichloroethene	Q	1,900	3,800
Freon 113	Q	1,900	3,800		Freon 113	2	1,900	3,800
cis-1,2-Dichloroethene	19,000	1,900	3,800	11.1%	cis-1,2-Dichloroethene	17,000	1,900	3,800
Chloroform	QN	1,900	3,800		Chloroform	Q	1,900	3,800
1,1,1-Trichloroethane	ND	1,900	3,800		1,1,1-Trichloroethane	2	1,900	3,800
Benzene	2,600	1,900	3,800	12.2%	Benzene	2,300	1,900	3,800
Trichloroethene	000'009	1,900	3,800	1.7%	Trichloroethene	290,000	1,900	3,800
Toluene	ON	1,900	3,800		Toluene	Q	1,900	3,800
Tetrachloroethene	ND	1,900	3,800		Tetrachloroethene	QN	1,900	3,800
m,p-Xylene	7,900	1,900	3,800	3.7%	m,p-Xylene	8,200	1,900	3,800
o-Xylene	6,400	1,900	3,800	1.6%	o-Xylene	6,500	1,900	3,800
Acetone	2	2,600	3,800		Acetone	Q	2,600	3,800
Modified Method 18					Modified Method 18			
9510149B-01A					9510149B-01B			
Vinyl chloride	2,600	75	1.5	8.0%	Vinyl chloride	2,400	75.0	1.5

					Field Duplicate			
Sample name: TEN-031					Sample name:TEX-032			
DC:10/13/95					DC:10/13/95			
DA:10/16/95					DA:10/16/95			
9510149A-02A					9510149A-03A			
TO-14	result	Ð	dilution		TO-14	result	5	dilution
	(vdda)	(vddd)	factor	RPD		(hddd)	(vqdd)	factor
Vinyl chloride	QN	2.1	4.2		Vinyl chloride	Q	2.5	2.0
1 1-Dichloroethene	2	2.1	4.2		1,1-Dichloroethene	ND	2.5	5.0
Freon 113	2	2.1	4.2		Freon 113	Q	2.5	5.0
cis-1 2-Dichlomethene	CN	2.1	4.2		cis-1,2-Dichloroethene	QN	2.5	5.0
Chloroform	Q	2.1	4.2		Chloroform	2	2.5	5.0
1 1 1-Trichloroethane	2	2.1	4.2		1,1,1-Trichloroethane	QN	2.5	5.0
Benzene	QN	2.1	4.2		Benzene	QN	2.5	5.0
Trichloroathana	S	21	4.2		Trichloroethene	9	2.5	5.0
Toliene	S	2.1	4.2		Toluene	S	2.5	5.0
Tetrachloroethene	2	2.1	4.2		Tetrachloroethene	2	2.5	5.0
m.p-Xvlene	2	2.1	4.2		m,p-Xylene	9	2.5	5.0
n-Xvlene	QX	2.1	4.2		o-Xylene	Q	2.5	5.0
Acetone	16	8.4	4.2	20.7%	Acetone	13	10	5.0
Modified Method 18					Modified Method 18			
9510149B-02A					9510149B-03A			
Vinyl chloride	QN	75	1.5		Vinyl chloride	ON	70	1.4

APPENDIX D

Cost Comparison Calculations and Data



Com 11/10/95

COST COMPARISON DATA FOR CATOX - URS MONTHLY REPORTS FOR ICT, ICT, & DUCL

ASSUME	LABOR	CDST	CF	\$60/HZ
--------	-------	------	----	---------

	HOURS OPERATING	LAGGE (HP/HROPERATION)	ELECTRICITY (KW/hr)	NATURAL GAS (THERMYHR)	LABOR (HR/HRMON	ATH) (HESY
IC1						
JUNE	645	0.2	23	6.7	0.17	(720)
July	412	0.3	23	7.1	0.17	(744)
AUGUST	193	0.6	23	7.4	0.16	(744
NG.		0.4	23	7.1	0.17	
						÷
TC7						
JUNE	37D	0,4	60	5.7	0.22	
AUGUST	181	6.7	_23_	9.5	0.17	
AV6.		0.5	42	7.6	0.20	
ou ca						
July	128	1,1	23	1,7	0,18	
AUGUST	615	0.2	_23_	2,2	6.20	
		0.65	23	2.0	0.19	
CVERALL AUG	·,	0.5	29	5.6	0.19	
	· .					
VALUES USED			23	5.6	0.20	

Table 3-6

Project Costs for June 1995

McClellan AFB, Site IC1

645 hrs. DRES 94-9896

	T				
Description	Unit	Unit Costs	Quantity	Cost	Notes
OPERATIONS/MAINTENANCE					
Contractor Labor	LS	\$7,260	1	\$7,260	
Utilities	1	\$7,200		\$7,200	
Electric	kwh	\$0.10	14,835	\$1,484	1
Natural Gas	therm	\$0.50	4,344	\$2,172	
Water	1000 gal	\$0.75	116	\$87	2
Caustic	Gallons	\$0.60	150	\$90	
O&M Supplies	LS	\$1,000	1	\$1,000	3
TOTAL OPERATIONS COSTS				\$12,093	
MONITORING				\$12,093	
Contractor Labor	LS	\$6,158	1	\$6,158	
Analytical		73,300		\$0,136	···
Mobile lab	Week	\$8,000	2.5	\$20,000	
TO-14 Analyses	Each	\$250	10	\$2,500	
Other analyses	LS	\$0	1	\$0	4
Stack Testing	LS	\$0	1	\$0	
TOTAL MONITORING COSTS				\$20,650	
DATA REDUCTION/REPORTING				\$28,658	5
Contractor Labor	LS	\$10,110	1	\$10.110	
Direct Costs	LS	\$800	1	\$10,110 \$800	5
TOTAL DATA/REPORTING COSTS				\$10,910	

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 645 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

Table 3-6
Project Costs for July 1995
McClellan AFB, Site IC1



	r					3
Description	Unit	Unit Costs	Quantity	Cost	Notes	
OPERATIONS/MAINTENANCE						
Contractor Labor	LS	\$7,500	1	\$7,500	<u> </u>	12
Utilities					1	1
Electric	kwh	\$0.061	9,476	\$578		12
Natural Gas	therm	\$0.233	2,920	\$680		1 -
Water	1000 gal	\$0.537	74	\$40	2	1
Water Discharged for Treatment	1000 gal	\$2.23	97	\$216		1
Caustic	Gallons	\$0.60	130	\$78		1
O&M Supplies	LS	\$1,800	1	\$1,800	3	1
TOTAL OPERATIONS COSTS				\$10,893		
MONITORING				-		
Contractor Labor	LS	\$5,800	1	\$5,800		1
Analytical						1
Mobile lab	Week	\$8,000	2.0	\$16,000	······································	1
TO-14 Analyses	Each	\$250	8	\$2,000		1
Other analyses	LS	\$0	0	\$0	4	1
Stack Testing	LS	\$0	0	\$0]
TOTAL MONITORING COSTS				\$23,800		
DATA REDUCTION/REPORTING					5	
Contractor Labor	LS	\$12,500	1	\$12,500	5	1
Direct Costs	LS	\$800	1	\$800]
TOTAL DATA/REPORTING COSTS				\$ 13,300	·	1

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 412 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

Table 3-9
Project Costs for August 1995

193 hx5

McClellan AFB, Site IC1

Description	Unit	Unit Costs	Quantity	Cost	Notes	
OPERATIONS/MAINTENANCE						
Contractor Labor	LS	\$7,000	1	\$7,000		116 h
Utilities					1	7
Electric	kwh	\$0.061	4,439	\$271		23
Natural Gas	therm	\$0.233	1,429	\$333		23/1 7.4/
Water	1000 gal	\$0.537	35	\$19	2	1 '''
Water Discharged for Treatment	1000 gal	\$2.23	246	\$549		1
Caustic	Gallons	\$0.60	220	\$132		1
O&M Supplies	LS	\$800	1	\$800	3]
TOTAL OPERATIONS COSTS				\$9,103		
MONITORING				47,103		1
Contractor Labor	LS	\$6,000	. 1	\$6,000	_	
Analytical						
Mobile lab	Week	\$8,000	1.3	\$10,000		1
TO-14 Analyses	Each	\$250	0	\$0		-
Other analyses	LS	\$2,281	1	\$2,281	4	1
Stack Testing	LS	\$0	0	\$0]
TOTAL MONITORING COSTS				\$18,281		-
DATA REDUCTION/REPORTING					5	
Contractor Labor	LS		1	\$13,000	5	1
Direct Costs	LS		1	\$800]
TOTAL DATA/REPORTING COSTS				\$13,800		4

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 193 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

160 MB

60 kw/hr 5,7 therm/hr

Decs 440, 298, 294

Table 3-7 Project Costs for June 1995

370 hrs.

McClellan AFB, Site IC7

Description	Unit	Unit Costs	Quantity	Cost	Notes
OPERATIONS/MAINTENANCE					
Contractor Labor	LS	\$9,599	1	\$9,599	
Utilities					1
Electric	kwh	\$0.10	22,200	\$2,220	
Natural Gas	therm	\$0.50	2,113	\$1,057	
Water	1000 gal	\$0.75	67	\$50	2
Caustic	Gallons	\$0.60	180	\$108	
O&M Supplies	LS	\$500	1	\$500	3
TOTAL OPERATIONS COSTS				\$13,533	
MONITORING					
Contractor Labor	LS	\$4,000	1	\$4,000	
Analytical					
Mobile lab	Week	\$8,000	2.5	\$20,000	4
TO-14 Analyses	Each	\$250	7	\$1,750	
Other analyses	LS	\$460	1	\$460	5
Stack Testing	LS	\$0	0	\$0	
TOTAL MONITORING COSTS				\$26,210	
DATA REDUCTION/REPORTING					6
Contractor Labor	LS	\$10,250	1	\$10,250	6
Direct Costs	LS	\$500	. 1	\$500	
TOTAL DATA/REPORTING COSTS				\$10,750	

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 370 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Mobile lab is apportioned between Sites IC 1 and IC 7.
- 5. Other analyses include residuals analyses.
- 6. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

Table 3-7
Project Costs for August 1995
McClellan AFB, Site IC7

181 hrs

Description	Unit	Unit Costs	Quantity	Cost	Notes	
OPERATIONS/MAINTENANCE						
Contractor Labor	LS	\$7,500	1	\$7,500		125 hvs
Utilities					1	1
Electric	kwh	\$0.061	4,163	\$254		23/hr
Natural Gas	therm	\$0.233	1,712	\$399		9.51n
Water .	1000 gal	\$0.537	33	\$17	2	1
Water Discharged for Treatment	1000 gal	\$2.23	141	\$314		1
Caustic	Gallons	\$0.60	85	\$51		1
O&M Supplies	LS	\$1,100	1	\$1,100	3	
TOTAL OPERATIONS COSTS				\$9,635		
MONITORING						
Contractor Labor	LS	\$6,500	1	\$6,500	·	1
Analytical						1
Mobile lab	Week	\$8,000	1.0	\$8,000		
TO-14 Analyses	Each	\$250	0	\$0		1
Other analyses	LS	\$0	0	\$0	4	
Stack Testing	LS	\$0	0	\$0		
TOTAL MONITORING COSTS				\$14,500		
DATA REDUCTION/REPORTING				421,000	5	
Contractor Labor	LS	\$13,000	1	\$13,000	5	1
Direct Costs	LS	\$800	1	\$800		
TOTAL DATA/REPORTING COSTS				\$13,800		

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 181 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

Table 3-10 Project Costs for July 1995 McClellan AFB, Site OU C1

128 hrs
DRES 94-96%

Description	Unit	Unit Costs	Quantity	Cost	Notes	
OPERATIONS/MAINTENANCE	•					
Contractor Labor	LS	\$8,200	1	\$8,200		137 h
Utilities					1] .
Electric	kwh	\$0.061	2,944	\$180		23/n
Natural Gas	therm	\$0.233	222	\$52		23/n 1.7/
Water	1000 gal	\$0.537	23	\$12	2] '
Water Discharged for Treatment	1000 gal	\$2.23	7	\$16]
Caustic	Gallons	\$0.60	375	\$225		
O&M Supplies	LS	\$4,500	1	\$4,500	3	
TOTAL OPERATIONS COSTS				\$13,184	as any opposite to	
MONITORING				\$13,104		
Contractor Labor	LS	\$8,500	1	\$8,500		
Analytical]
Mobile lab	Week	\$8,000	1.0	\$8,000]
TO-14 Analyses	Each	\$250	22	\$5,500] .
Other analyses	LS	\$0	0	\$0	4]
Stack Testing	LS	\$11,900	1	\$11,900		
TOTAL MONITORING COSTS	,			\$33,900		-
DATA REDUCTION/REPORTING					5	
Contractor Labor	LS	\$16,213	1	\$16,213	5	1
Direct Costs	LS	\$800	1	\$800]
TOTAL DATA/REPORTING COSTS				\$17,013		-

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 128 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

150 hra.

Table 3-11 Project Costs for August 1995 McClellan AFB, Site OU C1

615 hours DRES 96-97%

	T				
Description	Unit	Unit Costs	Quantity	Cost	Notes
OPERATIONS/MAINTENANCE					
Contractor Labor	LS	\$9,000	<u></u>	\$9,000	<u> </u>
Utilities		42,000		39,000	1
Electric	kwh	\$0.061	14,145	\$863	
Natural Gas	therm	\$0.233	1,324	\$308	
Water	1000 gal	\$0.537	111	\$59	2
Water Discharged for Treatment	1000 gal	\$2.23	26	\$58	<u>.</u>
Caustic	Gallons	\$0.60	1,245	\$747	
O&M Supplies	LS	\$400	1,243	\$400	. 3
				- 4700	· <u> </u>
TOTAL OPERATIONS COSTS				\$11,435	~
MONITORING		·		411,455	
Contractor Labor	LS	\$8,500	1	\$8,500	
Analytical				30,000	
Mobile lab	Week	\$8,000	1.8	\$14,000	
TO-14 Analyses	Each	\$250	17	\$4,250	······································
Other analyses	LS	\$6,783	1	\$6,783	4
Stack Testing	LS	\$ 0	0	\$0	•
TOTAL MONITORING COSTS					
DATA REDUCTION/REPORTING				\$33,533	
DAIA REDUCTION/REPORTING					5
Contractor Labor	LS	\$14,500	1	\$14,500	5
Direct Costs	LS	\$800	1	\$800	<u></u>
TOTAL DATA MEDICAL					
TOTAL DATA/REPORTING COSTS		T		\$15,300	

- 1. Utility costs are paid by McAFB. Unit costs are typical estimates.
- 2. Water usage is estimated at 3 gallons per minute for 615 operating hours.
- 3. O&M Supplies includes filter bags, oils, parts, etc.
- 4. Other analyses include residuals and fixed gases analyses.
- 5. This item includes analytical data review, technical data management (IRPMS diskette deliverables), data interpretations for system optimization, and weekly/monthly report preparation.

TECO PNEUMATIC

11/8/95

THERMORY CARMAL GOLTE-

ANNUAL RATE =
$$500$$
 DAILY RATE = $\frac{0.05}{365}$ = 1.37×10^{-4}
 5 yrs = 1825 DAYS

DAILY ANT. = (\$500,000)
$$\frac{(e^{1.37 \times 10^{-4}} - 1)}{(1 - e^{-(1.37 \times 10^{-4})})} = $309.67 / DAY$$

CATOX COSTS

\$350,000 (BASED ON DATA FROM MITTE)

REF.

THE MITTER CORPORATION. "SOIL VAPOR EXTRACTION CURTAILMENT PROCESS DEVELOPMENT".
JUNE, 1995.

2/4

Thermatrix Inc.

Park Lake Center 184 Shuman Blvd., Suite 200 Naperville, Illinois 60563 Tel: (708) 717-2911 FAX:(708) 717-0284 101 Metro Drive, Suite 248 San Jose, California 951 10 Tel: (408) 453-0490 FAX: (408) 453-0492

November 6, 1995

Ms. Courtney Morris Radian Corporation 10389 Old Placerville Rd. Sacramento, CA 95827

Dear Ms. Morris:

SUBJECT: THERMATRIX PROPOSAL No. 5309: McClellan Air Force Base Remediation

Thank you for your interest in Thermatrix flameless oxidation technology and for the opportunity to submit this budget proposal for treating a remediation off-gas stream. The fume is air containing chlorinated and nonchlorinated hydrocarbons at a flowrate of 500 to 1000 CFM. Supplemental fuel gas is required to maintain normal operating temperature in the oxidizer. Dilution air is not required during normal operation but is required for startup. The oxidizer recommended for this application is a recuperative GRC-800.

Capital Cost:

Depending on the accessories or features required, the basic oxidizer budget price for the application above is:

APPLICATION	MODEL	BUDGET PRICE		
		BUDGET	TO	FROM
Remediation The price does not include any a preparation, foundations, installa	GRC-800	\$300,000	+25%	-15%

Utility Requirements:

Based on 8760 annual operating hours, the estimated operating costs for the application described above would include:

CASEMODEL	UTILITY COST ESTIMATE				
	Electrical Power*			Supplemental Fuel Gas (\$3.00/mmBm)	
GRC-800	7 Hp/6 KW	\$3K/yr	0.5 warm Rondon	61384	
*Power consumption is based or	air and fume, blower mor	tor power requirements p	dus 1.2 KW control and instrument	pówer,	

A dilution air blower is provided with each oxidizer. A fume blower may be required to provide 25°WC static pressure necessary for oxidizer operation. It is presumed this blower would be installed near the fume source and can be provided as an option. The estimated power consumption for the fume blower is included above.

3/4

Page 2 Ms. Courtney Morris November 6, 1995

Performance:

Thermatrix typically guarantees oxidizer performance to a limit of 99.99% VOC destruction or a limit of 1 ppmv total VOC in the system outlet. Typical thermal NO_x emissions are 2 ppmv, and CO is usually undetectable (less than 10 ppmv).

Other:

The oxidizer exhaust contains an estimated 2100 ppmv (9.5 lb/hr) of HCl which may require abatement depending upon local regulatory requirements. Halogenated compounds require corrosion resistant materials of construction in the oxidizer which are provided with the GRC model. A quench/scrubber system, designed to remove 98% of the acid gases from the oxidizer exhaust can be provided as an option. The budget price for the quench/scrubber system is \$200,000.

Various grades of corrosion resistant materials of construction in the oxidizer can be provided as an option depending on customer requirements. The base budget price includes an estimate for material upgrades due to the relatively high concentration of HCl. The prices of acid-resistant materials are subject to wide variations due to supply and demand. Price adjustment for material upgrades may be necessary depending on market conditions at the time of purchase.

Typical delivery of oxidizer systems, FOB Knoxville, Tennessee, is 22 weeks after receipt of purchase order, allowing 4 weeks for development of engineering drawings and documents and 2 weeks for approval by buyer.

We trust you and Radian Corporation will find this information useful and appreciate your interest in Thermatrix technology. We look forward to working with you on this application and also others in the future. If you have any questions or if we can provide further information, please contact Howard Hohl at (708) 717-2911. Thank you for the opportunity to be of service.

Sincerely,

William D. Binder, P.E.

Proposal Manager

cc: Howard Hohl, Thermatrix Inc.

William D. Binder, P.E.

TEECO PNEUMATIC

CM 11/10/95

COST FOR ADDITION OF SHE BLOWER TO THERMATRIX UNIT COST PROPOSAL

BLOWDES

OILLES REGENERATIVE BLOWER, MOTOR MOUNTED GAST R7P3160M 16 HP at 5" Ha (=65"H20) > 600 cfm

(16 HP)(0,746 RM/HP)(1/20000FICIONCY) = 17.1 kW

\$2997 - 528 lb.

Accesseries -

FILTER 2 x AJ126G (2)(177.00) = \$354

MUFFLER: AJIZIGE

188.50

RELIEF VALUE 2x AG 258 (2×177.90) =\$355.80

\$898.3

TOTAL \$3895,3

30% FOR ENGINEERING, ETC.

\$5,063.89

ENERGY REDUIRENEUS FOR BLOWER: (16 HP)(0.746 RW/HP)= 11.9 RW

TOTAL THERMARK ENERGY REQUIREMENTS! ASSUME 3HP DILUTIONAIR BLOWER (3HP)(0,746) = 2.2 kW 1.2 kW FOR CONTROLE INSTRUMONT POWER 11.9 kw + 1.2 kw + 2.7 kw = 15.3 kw

DAILY USAGE = (15.3 kW)(22 hrs)= 336.6 kloh

LABOR: 12 HZ/WK (BASED ON 11/10/95 LETTER FROM BOB WILBOURNE, THERMATRIX) 12 He/WK = 0.07 He LABOR/HR (0.07.49/He) 22 He/Cay) = 1.5 He/Cay 168 He/wx

(1.5 He/DAY) (60 \$/HE) = \$90/DAY

TECOPNEUMATIC

CJM 11/10/95

THERMATRIX NOX:

1 ppm= 1,000 ppbv

11000 cfm)(1,000 ppbv)(46)(2,63×10-12)(60mir/w) = 0.007 16/hr

(0.007 blur / 20016) (8760hr) = 0.031 ton/yr (1.3) = 0.040

(\$19,750/ten)(0.040 ton/yr) = \$790.00/yr (SEE NOTE 1)

 $DAIW = (79D) \frac{(e^{1/37 \times 10^{-1}} - 1)}{(1 - e^{-(1/37 \times 10^{-4})})} = $2.22 | day$

CATION:

5.3 ppmv - OUCH NOX EMISSIONS FOR SEPTEMBER (URS, 1995)

(1,000 cAm) 5,300 ppbv) (46×263×10-12) (60 min/hr) = 0.038 16/hr

(0.038 1/w)(\frac{\frac{1}{2000}}{2000}) = 0.17 \frac{1}{2000}/yr (1.3) = 0.72

(\$19,750/ton \(0.22 \rightar/yr \) = \$4,345/yr

 $DAIN = (4345) \frac{(e^{1.37} \times 10^{14} - 1)}{(1 - e^{11.37 \times 10^{14}})^{245}} = #12.21/day$

NOTES:

1) \$19,750/ton From FINAL CERP-AWHORING TO CONSTRUCT PERMIT APPLICATION (RACIAN, 1995)
BYSED EN ERC TRANSACTIONS OCCURRENS IN 1994

URS, 1995, "MCCLELLAN AFBSVE SITES ICI, ICT, PROD DUCH, MONTHLY COPERATIONS REPORT - SEPTEMBER 1995"